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Alaska Population Overview
1981

Jay S. Hammond, Governor
State of Alaska

Edmund N. Orbeck, Commissioner
Department of Labor

John E. Post, Director
Administrative Services

Chuck Caldwell, Chief
Research and Analysis

David Swanson, Editor

PREFACE

Alaska Population Overview is designed to provide frequently requested population information in one publication. For the first time, it contains the official July 1st population determinations for incorporated places. These determinations were developed for, and in cooperation with, the Department of Community and Regional Affairs, which has the statutory responsibility for the annual population determinations used to distribute funds to taxing jurisdictions within the state.

Along with the official 1981 determinations for incorporated places, Section I presents for 1981 the available housing data for incorporated places, estimates of the population age sixty-five and over, and the population by race (white and non-white) for each of the twenty-three census areas defined by the 1980 federal census.

Following the section on 1981 population data, is Section II, which displays a variety of items that have become available from the 1980 census. The geographical range covers "Census Designated Places," cities, boroughs, census areas, and the state as a whole. In general, the smaller the area, the less detailed are the data. For example, at this time, population figures by age, race, and sex are available for the state as a whole but not for cities, boroughs, and census areas. Because of changes between the 1970 and 1980 census geography, a set of population estimates is also given for both the 1980 population by the twenty-nine 1970 Census Divisions and the 1970 population by the twenty-three 1980 Census Areas. Maps of these 1970 and 1980 census geographical regions are provided.

The third section of the report contains illustrative projections of the state's population to the year 1985. These projections, by age, race, and sex, are compiled using a standard demographic approach termed the "cohort-component" method. They are termed illustrative because they assume the continuation of current fertility and mortality trends under alternative assumptions of migration.

In the final section, two sets of special reports are provided. In the first set, a series of descriptive articles provide information on: the annual population determination program developed in cooperation with the Department of Community and Regional Affairs; the Federal-State Cooperative Program for Population Estimates, the Census Data Center Program, the quality and availability of 1980 Census Data; the results and costs of special 1981 censuses taken in six major cities; trends in selected demographic indicators, and revised population estimates for the state in the 1970's. In the second part of the final section, a series of technical reports is provided. These reports document the methodology used in making the 1981 population determinations, provide data on Alaskan life expectancy, discuss technical comparability of 1980, 1970, 1960 census products, and cover some technical issues involved in making sub-state population estimates.

Any comments or suggestions regarding the content or format of this publication are welcome. Questions related to: 1980 Census Data should be forwarded to Barbara Baker, (465-4513); federal intercensal estimates, Jo Van Patten, (465-2784); state estimates, projections, and special censuses, David Swanson. (465-2784)

Special acknowledgment is given to the Vital Statistics section, Department of Health and Social Services, the Enrollment Reports section, Department of Education, and each of the city and borough officials and staff members who provided data and worked cooperatively in developing the July 1st, 1981 population determinations. The population projections were produced with the technical assistance of the Data Processing Division, Alaska Department of Labor and a computer projection program developed by the Demographic Research Laboratory, Western Washington University.

People involved in the development of this publication are:

Department of Labor, Research and Analysis Section

Barbara Baker, Coordinator, Census Data Center
Linda Carroll, Lexitron Typist
Bertha Brooks, Lexitron Typist
Bill Elliot, Computer Operations Supervisor
Jim Fowler, Graphic Artist
Marilyn Gunn, Phototypesetter Operator
David Swanson, State Demographer
Jo Van Patten, Coordinator, Federal-State Cooperative Program For Population Estimates
Melanie Wilhelm, Administrative Assistant

Department of Community and Regional Affairs
Local Government Assistance Division

Palmer McCarter, Director
Netta Crago, Administrative Assistant
Doug Griffin, Local Government Specialist
Terrence May, Local Government Specialist

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I 1981 POPULATION AND HOUSING DATA

Introduction

This section of the 1981 edition of Population Overview contains: official 1980 and 1981 population determinations for the state and its sub-areas; estimates of the population by race and the population aged 65 years and over by census area; and, where available, housing information by municipality. The methods used to develop the 1981 data are documented in a report found in Section IV. The concepts and definitions used for the data, which are in accordance with those used by the U.S. Bureau of the Census, are discussed in Section II and in a report contained in Section IV. Detailed descriptions of these concepts and definitions are found in the **State of Alaska's Census Enumerator's Manual**, which is available from the State Demographer, Alaska Department of Labor.

Table I.1
Official Alaska Population, 1980 and 1981
By Census Area

Census Area	April 1, 1980 Population	July 1, 1981 Population
STATE OF ALASKA	401,851	422,187
Aleutian Islands	7,768	8,624
Anchorage, Municipality of	174,431	180,740
Bethel	10,999	10,864
Bristol Bay Borough	1,094	1,182
Dillingham	4,616	4,534
Fairbanks-North Star Borough	53,983	58,313
Haines Borough	1,680	1,712
Juneau, City and Borough of	19,528	21,080
Kenai Peninsula Borough	25,282	26,520
Ketchikan Gateway Borough	11,316	11,373
Kobuk	4,831	4,960
Kodiak Island Borough	9,939	9,728
Matanuska-Susitna Borough	17,816	19,123
Nome	6,537	7,565
North Slope Borough*	4,199	7,098
Prince of Wales Island - Outer Ketchikan	3,822	4,041
Sitka, City and Borough of	7,803	7,927
Skagway - Yakutat - Angoon	3,478	3,311
Southeast Fairbanks	5,676	5,803
Valdez- Cordova	8,348	8,846
Wade Hampton	4,665	4,726
Wrangell - Petersburg	6,167	6,541
Yukon - Koyukuk	7,873	7,576

* The 1981 population estimate for the North Slope Borough is based on censuses conducted by each of the cities inside the Borough except Barrow, along with a Borough-wide census of all villages and oil-related work sites.

A degree of caution is needed in comparing the 1980 and 1981 population data given for the North Slope Borough. In 1980, the U.S. Bureau of the Census treated the Prudhoe Bay area as a unique site and departed from the definition of "residency" used for Alaska's population determinations. By doing this, the oil workers who could have been counted as census residents of the Prudhoe Bay area (based upon the amount of time spent at Prudhoe Bay) were "allocated" to a community stated to be an oil worker's "usual place of residence". The difference between the Census Bureau's 1980 figure and the State's 1981 figure (which is based on a complete census of all oil-related work sites) is not based on a fundamental difference in residency definitions used by the Census Bureau and the State. The State's census program is recognized by the U.S. Census Bureau as being in accordance with its own definitions and concepts. Further, the Census Bureau accepts the state-certified census results in the annual population determinations that are used for federal revenue sharing. The difference between the 1980 and 1981 figures is based upon the procedural policy implemented by the U.S. Census Bureau that in effect did not treat Prudhoe Bay as a place in which people "resided".

Table I.2
Official Alaska Population
Cities and Boroughs
1980 and 1981
By Census Area

	April 1, 1980 Population	July 1, 1981 Population
STATE OF ALASKA	401,851	422,187
Aleutian Islands Census Area	7,788	8,624
Akutan	169	189
King Cove	460	513
Saint Paul	551	591*
Sand Point	625	697
Unalaska	1,322	1,944**
Total Incorporated Places	3,127	3,934
Remainder	4,641	4,690
Anchorage, Municipality of	174,431	180,740
Total Incorporated Places	174,431	180,740
Remainder	0	0
Bethel Census Area	10,999	10,864
Akiachak	438	435
Akiak	198	197
Akolmiut	641	695*
Aniak	341	338
Atmautluak	219	226*
Bethel	3,576	3,549
Chefornak	230	230*
Chuathbaluk	105	104
Eek	228	226
Goodnews Bay	168	167
Kwethluk	454	451
Mekoryuk	160	176*
Napakiak	262	283
Napaskiak	244	242
Newtok	131	175*
Nightmute	119	135*
Platinum	55	55
Quinhagak	412	409
Toksook Bay	333	331
Tuluksak	236	234
Tununak	298	301*
Lower Kalskag	246	244
Upper Kalskag	129	128
Total Incorporated Places	9,223	9,331
Remainder	1,776	1,533
Bristol Bay Borough	1,094	1,182
Total Incorporated Places	1,094	1,182
Remainder	0	0
Dillingham Census Area	4,616	4,534
Aleknagik	154	152
Clark's Point	79	78
Dillingham	1,563	1,670*
Ekwok	77	76
Manokotak	294	290
Newhalen	87	135*
New Stuyahok	331	327
Nondalton	173	171
Port Heiden	92	91
Togiak	470	511*
Total Incorporated Places	3,320	3,501
Remainder	1,296	1,033

Table I.2
Official Alaska Population
Cities and Boroughs
1980 and 1981
By Census Area
(Continued)

	April 1, 1980 Population	July 1, 1981 Population
Fairbanks-North Star Borough	53,983[1/]	58,313[1/]
Fairbanks	22,645	25,568**
North Pole	724	928*
Total Incorporated Places	23,369	26,496
Remainder	30,614	31,817
Haines Borough	1,680	1,712
Haines	993	1,017
Total Incorporated Places	993	1,017
Remainder	687	695
Juneau, City and Borough of	19,528	21,080
Juneau, City and Borough of	19,528	21,080
Total Incorporated Places	19,528	21,080
Remainder	0	0
Kenai Peninsula Borough	25,282	26,520
Homer	2,209	2,588
Kachemak	403	425
Kenai	4,324	4,558
Seldovia	479	505
Seward	1,843	1,943
Soldotna	2,320	2,445
Total Incorporated Places	11,578	12,464
Remainder	13,704	14,056
Ketchikan Gateway Borough	11,316	11,373
Ketchikan	7,198	7,200
Saxman	273	276
Total Incorporated Places	7,471	7,476
Remainder	3,845	3,897
Kobuk Census Area	4,831	4,960
Ambler	192	198
Buckland	177	211*
Deering	150	155
Kiana	345	356
Kivalina	241	249
Kobuk	62	64
Kotzebue	2,054	2,250
Noorvik	492	508
Selawik	361	372
Shungnak	202	208
Total Incorporated Places	4,276	4,571
Remainder	555	389
Kodiak Island Borough	9,939[2/]	9,728[2/]
Akhiok	105	103
Kodiak	4,756	4,678
Larsen Bay	168	167*
Old Harbor	340	334
Ouzinkie	173	170
Port Lions	215	218
Total Incorporated Places	5,757	5,6[illegible]
Remainder	4,182	4,065

Table I.2
Official Alaska Population
Cities and Boroughs
1980 and 1981
By Census Area
(Continued)

	April 1, 1980 Population	July 1, 1981 Population
Matanuska-Susitna Borough	17,816	19,123
Houston	370	583
Palmer	2,141	2,275
Wasilla	1,559	1,928
Total Incorporated Places	4,070	4,786
Remainder	13,746	14,337
Nome Census Area	6,537	7,565
Brevig Mission	138	149
Diomede	139	149*
Elim	211	228
Gambell	445	480
Golovin	87	94
Koyuk	188	203
Nome	2,301	3,039**3/
St. Michael	239	258
Savoonga	491	530
Shaktoolik	164	177
Shishmaref	394	425
Stebbins	331	357
Teller	212	229*
Unalakleet	623	672
Wales	133	143
White Mountain	125	135
Total Incorporated Places	6,221	7,268
Remainder	316	297
North Slope Borough 4/	4,199	7,098
Anaktuvak Pass	203	235*
Barrow	2,207	2,539
Kaktovik	165	201*
Nuiqsut	208	270*
Point Hope	464	531*
Wainwright	405	410*
Total Incorporated Places	3,652	4,186
Remainder	547	2,912*
Prince of Wales-Outer Ketchikan Census Area	3,822	4,041
Craig	527	560
Hydaburg	298	356*
Kasaan	25	64*
Klawock	318	389*
Total Incorporated Places	1,168	1,369
Remainder	2,654	2,672
Sitka, City and Borough of	7,803	7,927
Total Incorporated Places	7,803	7,927
Remainder	0	0
Skagway-Yakutat-Angoon Census Area	3,478	3,311
Angoon	465	445
Hoonah	680	799*
Pelican	180	172
Skagway	768	819
Tenakee Springs	138	132
Yakutat	449	430
Total Incorporated Places	2,680	2,797
Remainder	798	514

Table I.2
Official Alaska Population
Cities and Boroughs
1980 and 1981
By Census Area
(Continued)

	April 1, 1980 Population	July 1, 1981 Population
Southeast Fairbanks Census Area	5,676	5,803
Delta Junction	945	945
Eagle	110	186*
Total Incorporated Places	1,055	1,131
Remainder	4,621	4,672
Valdez-Cordova Census Area	8,348	8,846
Cordova	1,879	2,223**
Valdez	3,079	3,279
Whittier	198	211
Total Incorporated Places	5,156	5,713
Remainder	3,192	3,133
Wade Hampton Census Area	4,665	4,726
Alakanuk	522	534*
Chevak	466	491*
Emmonak	567	568*
Fortuna Ledge	262	243*
Hooper Bay	627	624
Kotlik	293	339*
Mountain Village	583	580
Pilot Station	325	323
Russian Mission	169	168
St. Mary's	382	432*
Scammon Bay	250	249
Sheldon Point	103	103
Total Incorporated Places	4,549	4,654
Remainder	116	72
Wrangell-Petersburg Census Area	6,167	6,541
Kake	555	583
Kupreanof	47	49
Petersburg	2,821	3,001**
Port Alexander	86	90
Wrangell	2,184	2,345**
Total Incorporated Places	5,693	6,068
Remainder	474	473
Yukon-Koyukuk Census Area	7,873	7,576
Allakaket	163	158
Anderson	517	500
Anvik	114	110
Fort Yukon	619	599
Galena	765	805*
Grayling	209	202
Holy Cross	241	233
Hughes	73	71
Huslia	188	230*
Kaltag	247	239
Koyukuk	98	95
McGrath	355	343
Nenana	470	592
Nikolai	91	88
Nulato	350	338
Ruby	197	190
Shageluk	131	127
Tanana	388	463*
Total Incorporated Places	5,216	5,383
Remainder	2,657	2,193

FOOTNOTES

1/ Although Eielson Air Force Base is located within the boundaries of the Fairbanks-North Star Borough, it has not been officially annexed to the Borough. Its resident population is, however, included in the total Borough population.

2/ Kodiak Island Coast Guard Station is located within the boundaries of the Kodiak Island Borough but it has never been annexed to the Borough. Its resident population is, however, included in the total Borough population.

3/ The 1981 state-assisted census of Nome was based on municipal boundaries as redefined after the 1980 federal census.

4/ The 1981 population estimate for the North Slope Borough is based on censuses conducted by each of the cities inside the Borough except Barrow, along with a Borough-wide census of all villages and oil-related work sites.

A degree of caution is needed in comparing the 1980 and 1981 population data given for the North Slope Borough. In 1980, the U.S. Bureau of the Census treated the Prudhoe Bay area as a unique site and departed from the definition of "residency" used for Alaska's population determinations. By doing this, the oil workers who could have been counted as census residents of the Prudhoe Bay area (based upon the amount of time spent at Prudhoe Bay) were "allocated" to a community stated to be an oil worker's "usual place of residence". The difference between the Census Bureau's 1980 figure and the State's 1981 figure (which is based on a complete census of all oil-related work sites) is not based on a fundamental difference in residency definitions used by the Census Bureau and the State. The State's census program is recognized by the U.S. Census Bureau as being in accordance with its own definitions and concepts. Further, the Census Bureau accepts the state-certified census results in the annual population determinations that are used for federal revenue sharing. The difference between the 1980 and 1981 figures is based upon the procedural policy implemented by the U.S. Census Bureau that in effect did not treat Prudhoe Bay as a place in which people "resided".

* Indicates a census conducted by a municipality in accordance with State guidelines.

** Indicates a census conducted under the auspices of, and certified by the State Demographer.

Table I.3
Official July 1, 1981 Alaska Population
By Organized Area and Date of Incorporation

UNIFIED HOME RULE MUNICIPALITIES

	JULY 1, 1981 POPULATION	ESTIMATED SQ. MILES	INCORPORATION DATE
City and Borough of Juneau	21,080	3,100	July 1, 1970
City and Borough of Sitka	7,927	4,480	December 2, 1971
Municipality of Anchorage	180,740	1,884	September 15, 1975

ORGANIZED BOROUGHS

CLASSIFICATION	JULY 1, 1981 POPULATION	ESTIMATED SQ. MILES	INCORPORATION DATE
Home Rule			
North Slope Borough	7,098 1/	88,281	July 1, 1972
Second Class			
Bristol Bay Borough	1,182	1,200	October 2, 1962
Fairbanks North Star Borough	51,659 2/	7,500	January 1, 1964
Kenai Peninsula Borough	26,520	14,697	January 1, 1964
Ketchikan Gateway Borough	11,373	1,250	September 6, 1963
Kodiak Island Borough	8,358 3/	5,440	September 30, 1963
Matanuska-Susitna Borough	19,123	20,544	January 1, 1964
Third Class			
Haines Borough	1,712 4/	2,620	August 29, 1968

1/ Based on a special population count of unincorporated communities and oil-related work sites conducted and and certified by the State Demographer, Alaska Department of Labor.
2/ Portions of Fort Wainwright have been annexed to the City of Fairbanks; Eielson Air Force Base is excluded from the Fairbanks-North Star Borough.
3/ Excludes the Kodiak Coast Guard Station.
4/ Excludes residents of the Klukwan Indian Reservation.

Table I.3
(Continued)

INCORPORATED COMMUNITIES

Classification	7-1-81 Pop.	Incorp. Date
Home Rule Cities (11)		
Cordova	2,223	1909
Fairbanks	25,568	1903
Kenai	4,558	1960
Ketchikan	7,200	1900
Kodiak	4,678	1940
North Pole	928	1953
Palmer	2,275	1951
Petersburg	3,001	1910
Seward	1,943	1912
Valdez	3,279	1901
Wrangell	2,345	1903
First Class Cities(21)		
Barrow	2,539	1959
Craig	560	1922
Dillingham	1,670	1963
Galena	805	1971
Haines	1,017	1910
Homer	2,588	1964
Hoonah	799	1946
Hydaburg	356	1927
Kake	583	1952
King Cove	513	1947
Klawock	389	1929
Nenana	592	1921
Nome	3,039	1901
Pelican	172	1943
Saint Mary's	432	1967
Sand Point	697	1978
Seldovia	505	1945
Skagway	819	1900
Soldotna	2,445	1967
Unalaska	1,944	1942
Yakutat	430	1948
Second Class Cities(109)		
Akhiok	103	1972
Akiachak	435	1974
Akiak	197	1970
Akolmiut	695	1969
Akutan	189	1979
Alakanuk	534	1969
Aleknagik	152	1973
Allakaket	158	1975
Ambler	198	1971
Anaktuvuk Pass	235	1957
Anderson	500	1962
Anguon	445	1963
Aniak	338	1972
Anvik	110	1969
Atmautluak	226	1976
Betnel	3,549	1957
Brevig Mission	149	1969
Buckland	211	1966
Chefornak	230	1974
Chevak	491	1967
Chuathabaluk	104	1975
Clark's Point	78	1971
Cold Bay	228	1982
Desring	155	1970
Delta Junction	945	1960
Diomede	149	1970
Eagle	186	1901
Eek	226	1970
Ekwok	76	1974
Elim	228	1970
Emmonak	568	1964
Fort Yukon	599	1959
Fortuna Ledge	243	1970
Gambell	480	1963
Golovin	94	1971
Goodnews Bay	167	1970
Grayling	202	1969
Holy Cross	233	1968
Hooper Bay	624	1966
Houston	583	1966
Hughes	71	1973
Huslia	230	1969
Kachemak	425	1961
Kaktovik	201	1971
Kaltag	239	1969
Kasaan	64	1976
Kiana	356	1964
Kivalina	249	1969
Kobuk	64	1973
Kotlik	339	1970
Kotzebue	2,250	1958
Koyuk	203	1970
Koyukuk	95	1973
Kupreanof	49	1975
Kwethluk	451	1975
Larsen Bay	167	1974
Lower Kalskag	244	1969
Manokotak	290	1970
McGrath	343	1975
Mekoryuk	176	1969
Mountain Village	580	1967
Napakiak	283	1970
Napaskiak	242	1971
New Stuyahok	327	1972
Newhalen	135	1971
Newtok	175	1976
Nightmute	135	1974
Nikolai	88	1970
Nondalton	171	1971
Noorvik	506	1964
Nuiqsut	270	1975
Nulato	338	1963
Old Harbor	334	1966
Ouzinkie	170	1967
Pilot Station	323	1969
Platinum	54	1975
Point Hope	531	1966
Port Alexander	90	1974
Port Heiden	91	1972
Port Lions	218	1966
Quinnagak	409	1975
Ruby	190	1973
Russian Mission	168	1970
Saint Michael	258	1969
Saint Paul	591	1971
Savoonga	530	1969
Saxman	276	1930
Scammon Bay	249	1967
Selawik	372	1977
Shageluk	127	1970
Shaktoolik	177	1969
Sheldon Point	103	1974
Shishmaref	425	1969
Shungnak	208	1967
Stebbins	357	1969
Tanana	463	1961
Teller	229	1963
Tenakee Springs	132	1971
Togiak	511	1969
Toksook Bay	331	1972
Tuluksak	234	1970
Tununak	301	1975
Unalakleet	672	1974
Upper Kalskag	128	1975
Wainwright	410	1962
Wales	143	1964
Wasilla	1,928	1974
White Mountain	135	1969
Whittier	211	1969
Organized Under Federal Law		
Metlakatla	1,056	1944

Population data from FY 1982 State Revenue Sharing Program.

This map may be obtained from the Division of Local Government Assistance in Juneau, Anchorage, Nome, Kotzebue, Fairbanks and Betnel or the Division of Community Planning in Juneau and Anchorage.

Table I.4
Alaska Boroughs and Cities Ranked by Population
1981

	July 1st Population
Anchorage Municipality	180,740
Fairbanks N. Star Borough	51,659
Kenai Peninsula Borough	26,520
Fairbanks City	25,568
Juneau City & Borough	21,080
Matanuska-Susitna Borough	19,123
Ketchikan Borough	11,373
Kodiak Island Borough	8,358
Sitka City & Borough	7,927
Ketchikan City	7,200
North Slope Borough	7,098
Kodiak City	4,678
Kenai	4,558
Bethel	3,549
Valdez	3,279
Nome	3,039
Petersburg	3,001
Homer	2,588
Barrow	2,539
Soldotna	2,445
Wrangell	2,345
Palmer	2,275
Kotzebue	2,250
Cordova	2,223
Unalaska	1,944
Seward	1,943
Wasilla	1,928
Haines Borough	1,712
Dillingham	1,670
Bristol Bay Borough	1,182
Metlakatla	1,056
Haines City	1,017
Delta Junction	945
North Pole	928
Skagway	819
Galena	805
Hoonah	799
Sand Point	697
Akolmiut	695
Unalakleet	672
Hooper Bay	624
Fort Yukon	599
Kenana	592
St. Paul	591
Houston	583
Kake	583
Mountain Village	580
Emmonak	568
Craig	560
Alakanuk	534
Point Hope	531
Savoonga	530
King Cove	513
Togiak	511
Noorvik	508
Seldovia	505
Anderson	500
Chevak	491
Gambell	480
Tanana	463
Kwethluk	451
Angoon	445
Akiachak	435
St. Mary's	432
Yakutat	430
Kachemak	425
Shishmaref	425
Wainwright	410
Quinhagak	409
Klawock	389
Selawik	372
Stebbins	357
Hydaburg	356
Kiana	356
McGrath	343
Kotlik	339

	July 1st Population
Aniak	338
Mulato	338
Old Harbor	334
Toksook Bay	331
New Stuyakok	327
Pilot Station	323
Tununak	301
Manokatak	290
Napakiak	283
Saxman	276
Nuiqsut	270
St. Michael	258
Kivalina	249
Scammon Bay	249
Lower Kalskag	244
Fortuna Ledge	243
Napaskiak	242
Kaltag	239
Anaktuvuk Pass	235
Tuluksak	234
Holy Cross	233
Chefornak	230
Huslia	230
Teller	229
Cold Bay	228
Elim	228
Atmautluak	226
Eek	226
Port Lions	218
Buckland	211
Whittier	211
Shungnak	208
Koyuk	203
Grayling	202
Naktovik	201
Ambler	198
Akiak	197
Ruby	190
Akutan	189
Eagle	186
Shaktoolik	177
Mekoryuk	176
Pelican	172
Nondalton	171
Ouzinkie	170
Russian Mission	168
Goodnews Bay	167
Larsen Bay	167
Allakaket	158
Deering	155
Aleknagik	152
Brevig Mission	149
Diomede	149
Wales	143
Newhalen	135
Nightmute	135
White Mountain	135
Tenakee Spring	132
Upper Kalskag	128
Shageluk	127
Anvik	110
Chuathahaluk	104
Akhiok	103
Sheldon Point	103
Koyukuk	95
Golovin	94
Port Heiden	91
Port Alexander	90
Nikolai	88
Clark's Point	78
Ekwok	76
Hughes	71
Kasaan	64
Kobuk	64
Platinum	55
Kupreanof	49

Table I.5
Population in Households and Group Quarters
Number of Housing Units and Households
and Average Household Size
Selected Cities in Alaska

	July 1, 1981				April 1,
	1981 Persons in Households	1981 Persons in Group Qtrs.	1981 Housing Units/ Households	1981 Persons per Household	1980 Persons per Household
Akolmiut	695	0	263/195	3.56	4.97
Alakanuk	534	0	N/A/109	4.90	4.05
Atmautluak	226	0	62/43	N/A	6.05
Chefornak	230	0	N/A	N/A	5.07
Chevak	491	0	87/84	5.85	5.07
Cordova	2,114	109	854/808	2.62	2.67
Dillingham	1,656	N/A	N/A	N/A	3.35
Eagle	186	N/A	N/A	N/A	2.29
Emmonak	601	N/A	N/A	N/A	4.44
Fairbanks	23,564	2,004	9,853/9,124	2.58	2.60
Fortuna Ledge	247	0	81/59	4.19	4.09
Galena	805	0	198/173	4.65	3.19
Hoonah	799	0	216/204	3.92	3.99
Huslia	230	0	68/68	3.38	3.19
Hydaburg	356	0	119/110	3.24	3.07
Kasaan	N/A	N/A	N/A	N/A	2.78
King Cove	513	N/A	N/A	N/A	4.03
Klawock	389	0	118/104	3.74	4.03
Kotlik	339	0	72/68	4.99	4.97
Koyuk	188	0	52/48	3.92	3.92
Larsen Bay	147	20	60/44	3.34	3.51
Mekoryuk	176	0	47/47	3.74	3.64
Napakiak	283	0	N/A	N/A	4.37
Nenana	592	0	N/A	N/A	2.88
Newtok	175	0	31/29	6.03	4.68
Nightmute	135	0	35/NA	N/A	4.96
Nome	2,956	83	1,022/963	3.07	3.24
North Pole	928	0	367/309	3.00	2.91
Nuiqsut	303	0	64/64	4.73	4.16
Petersburg	2,918	83	1,104/1,059	2.76	2.84
Point Hope	N/A	N/A	N/A	N/A	4.73
St. Mary's	N/A	N/A	N/A	N/A	4.92
St. Paul	N/A	N/A	N/A	N/A	4.18
Sand Point	N/A	N/A	N/A	N/A	3.10
Tanana	463	0	165/150	3.09	3.19
Togiak	513	0	130/114	4.50	4.65
Tununak	301	0	135/113	2.66	4.38
Unalaska	1,054	890	469/421	2.50	2.38
Wrangell	2,321	24	885/827	2.81	2.82

Table I.6
Population Total, White and Non-White
By Census Area
State of Alaska
July 1, 1981*

Census Area	Total Population	White Population	Non-White Population	Percent Non-White
Aleutian Islands	8624	5232	3392	39.33
Anchorage Borough	180740	152677	28063	15.53
Bethel	10864	1719	9145	84.18
Bristol Bay Borough	1182	685	497	42.05
Dillingham	4534	1037	3497	77.13
Fairbanks North Star Borough	58313	49547	8766	15.03
Haines Borough	1712	1467	245	14.31
Juneau Borough	21080	17773	3307	15.69
Kenai Peninsula Borough	26520	24225	2295	8.65
Ketchikan Gateway Borough	11373	9513	1860	16.35
Kobuk	4960	713	4247	85.63
Kodiak Island Borough	9728	6836	2892	29.73
Matanuska-Susitna Borough	19123	18068	1055	5.52
Nome	7565	1469	6096	80.58
North Slope Borough	7098	3382	3716	52.35
Prince of Wales-Outer Ketchikan	4041	2178	1863	46.10
Sitka Borough	7927	5847	2080	26.24
Skagway-Yakutat-Angoon	3311	1852	1459	44.07
Southeast Fairbanks	5803	4573	1230	21.20
Valdez-Cordova	8846	7360	1486	16.80
Wade Hampton	4726	305	4421	93.55
Wrangell-Petersburg	6541	5113	1428	21.83
Yukon-Koyukuk	7576	3160	4416	58.29
STATE TOTAL	422187	324731	97456	23.08

* July 1st estimates are developed for the total resident population, which is defined in accordance with the concept of residence used by the U.S. Bureau of the Census. This definition includes people in the military and in institutions.

Table I.7
Population 65 Years and Over
By Census Area
State of Alaska
July 1, 1981*

Census Area	Total Population	Population Aged 65 and Over	Percent Aged 65 and Over
Aleutian Islands	8624	120	1.39
Anchorage Borough	180740	3700	2.05
Bethel	10864	380	3.50
Bristol Bay Borough	1182	100	8.46
Dillingham	4534	200	4.41
Fairbanks North Star Borough	58313	1470	2.52
Haines Borough	1712	120	7.01
Juneau Borough	21080	1130	5.36
Kenai Peninsula Borough	26520	890	3.36
Ketchikan Gateway Borough	11373	720	6.33
Kobuk	4960	220	4.44
Kodiak Island Borough	9728	250	2.57
Matanuska-Susitna Borough	19123	740	3.87
Nome	7565	370	4.89
North Slope Borough	7098	150	2.11
Prince of Wales-Outer Ketchikan	4041	160	3.96
Sitka	7927	370	4.67
Skagway-Angoon-Yakutat	3311	180	5.44
Southeast Fairbanks	5803	80	1.38
Valdez-Cordova	8846	310	3.50
Wade Hampton	4726	130	2.75
Wrangell-Petersburg	6541	340	5.20
Yukon-Koyukuk	7576	220	2.90
STATE TOTAL	422,187	12350	2.93

* July 1st estimates are developed for the resident population, which is defined in accordance with the concept of residency used by the U.S. Bureau of the Census and includes people in institutions.

II. POPULATION AND HOUSING DATA AVAILABLE FROM THE 1980 CENSUS

Introduction

In this section the published data available from the 1980 census are presented along with selected data from both the 1970 and 1960 censuses. The data encompass the state as a whole, its census-defined areas and sub-areas, municipalities, and selected unincorporated communities. Some inconsistencies are present in the tables representing the 1980 data because of incomplete revisions issued by the U.S. Bureau of the Census.

Alaska has no statewide political subdivisions equivalent to the county form of government found in the majority of states. Consequently, its census-defined geographical areas have not been consistent in the 1960, 1970, and 1980 censuses. As an aid to developing some consistency over time this section contains 1980 and 1970 population by 1980 census areas and 1980 and 1970 population by 1970 census divisions. These results, which have been developed by the Alaska Department of Labor are contained in Tables II.9 and II.10, respectively. Maps and conversions pertaining to 1960, 1970, and 1980 censuses are found in the special report entitled "Technical Comparability of the 1980 Census to Those Conducted in 1970 and 1960," which is in Section IV.

In general, the smaller an area is, the less detailed become the census data. For example: Tables II.1 through II.6 show detailed race, sex, and age data for the state as a whole while Tables II.7 and II.8 show, for places, municipalities, and census areas, only total population; and Tables II.12 through II.22 show detailed data available for housing and household characteristics for the state as a whole, while Table II.23 provides a smaller set for the state's census areas, and Table II.24 provides even less detailed data for municipalities.

Besides changes in census geography, there have been changes in many definitions and concepts between each census. These changes have not been directed solely at Alaska but have been generally applied uniformly throughout the United States (For an exception, see Footnote #4, Table I.2, in Section I of this issue of Alaska Population Overview). The special report cited earlier, which deals with comparability of census products, discusses the definitional and conceptual changes in the 1980, 1970, and 1960 censuses.

The schedule for release of products from the 1980 census has been subjected to major revisions since the time of the actual count. This subject is discussed in the report "Availability of 1980 Census Products" found in Section IV.

Table II.1
Persons By Race, 1980
State of Alaska

White	309726
Black	13643
American Indian, Eskimo, and Aleut:	
American Indian	21869
Eskimo	34144
Aleut	8090
Asian and Pacific Islander:	
Japanese	1595
Chinese	522
Filipino	3092
Korean	1536
Asian Indian	241
Vietnamese	383
Hawaiian	402
Guamanian	149
Samoan	134
Other	6323

Table II.2
Persons By Selected Age Groups and Race, 1980
State of Alaska

	Under 5 Years	5 to 17 Years	18 to 64 Years	65 Years And Over
Total	38949	91796	259559	11547
White	28216	65962	207413	8137
Black	1591	2945	8893	214
American Indian, Eskimo, and Aleut	7320	19622	34280	2881
Asian and Pacific Islander	835	1615	5376	228

Table II.3
Persons of Spanish Origin
By Selected Age Groups, 1980
State of Alaska

	Under 5 Years	5 to 17 Years	18 to 64 Years	65 Years And Over
Total	1291	2425	5705	86
White	679	1393	2987	34
Black	36	37	148	1

Table II.4
Persons By Sex, Race, and Age, 1980
State of Alaska

	ALL RACES			WHITE			BLACK			OTHER RACES		
	BOTH SEXES	MALE	FEMALE	BOTH SEXES	MALE	FEMALE	BOTH SEXES	MALE	FEMALE	BOTH SEXES	MALE	FEMALE
TOTAL	400481	212321	188160	309455	164916	143539	13619	7663	5956	77407	39742	37665
Under 5 Years Old	38777	19944	18833	28043	14441	13602	1587	801	786	9147	4702	4445
5 to 9 Years Old	34917	17897	17020	25266	13010	12256	1327	676	651	8324	4211	4113
10 to 14 Years Old	34166	17624	16542	24556	12701	11857	1003	499	504	8605	4424	4181
15 to 19 Years Old	30980	15743	15237	26321	14214	12107	1190	656	534	9469	4873	4596
20 to 24 Years Old	45058	24153	20906	34130	18283	15847	2403	1505	898	8525	4365	4160
25 to 29 Years Old	48542	25629	23013	38890	20504	18395	2148	1268	879	7497	3757	3740
30 to 34 Years Old	41916	22561	19355	34844	18854	15790	1179	729	450	6093	2978	3115
35 to 39 Years Old	31182	17001	14181	25864	14279	11585	742	423	319	4576	2299	2277
40 to 44 Years Old	22570	12410	10160	18345	10237	8112	593	336	258	3629	1838	1790
45 to 49 Years Old	18355	9956	8399	14740	8129	6611	457	252	205	3158	1575	1583
50 to 54 Years Old	15801	8684	7117	12987	7218	5649	347	187	160	2467	1279	1308
55 to 59 Years Old	12562	6769	5823	10215	5827	4688	266	137	129	2111	1105	1006
60 to 64 Years Old	8095	4297	3798	6436	3603	2832	166	86	80	1493	707	786
65 to 69 Years Old	5191	2731	2460	3782	2000	1782	100	56	44	1329	675	654
70 to 74 Years Old	3109	1541	1568	2158	1060	1128	65	32	33	856	449	407
75 to 79 Years Old	1843	884	959	1239	575	664	33	18	15	571	291	280
80 to 84 Years Old	769	350	419	525	235	290	7	1	6	237	114	123
85 to 90 Years Old	618	247	371	408	145	264	8	2	6	201	100	101
Under 15 Years Old	107860	55465	52395	77867	40152	37715	3917	1976	1941	26076	13337	12739
15 to 64 Years Old	281091	151103	129988	222465	120749	101716	9489	5578	3911	49137	24776	24361
65 Years or Older	11530	5753	5777	8123	4015	4108	213	109	104	3194	1829	1365

* Figures are based upon preliminary totals. The revised total population for Alaska is 401,851.

Table II.5
Persons By Selected Age Groups and Sex, 1980
State of Alaska

	Total	Male	Female
Under 1 Year	8753	4452	4301
1 and 2 Years	15708	8148	7560
3 and 4 Years	14488	7440	7048
5 Years	6956	3610	3346
6 Years	6670	3356	3314
7 to 9 Years	21417	10977	10440
10 to 13 Years	27320	14027	13293
14 Years	6962	3693	3269
15 Years	7380	3824	3556
16 Years	7503	3982	3521
17 Years	7588	4008	3580
18 Years	6962	3729	3233
19 Years	7721	4276	3445
20 Years	8404	4677	3727
21 Years	8728	4823	3905
22 to 24 Years	27958	14686	13272
25 to 29 Years	48645	25564	23081
30 to 34 Years	42163	22676	19487
35 to 44 Years	54022	29561	24461
45 to 54 Years	34243	18693	15550
55 to 59 Years	12617	6777	5840
60 and 61 Years	3672	1934	1738
62 to 64 Years	4424	2369	2055
65 to 74 Years	8312	4278	4034
75 to 84 Years	2616	1234	1382
85 Years and Over	619	247	372
Median	26.1	26.3	25.8
Voting Age Population (18 Years and Over)	271108		

Table II.6
Persons By Single Year of Age, 1980
State of Alaska

Age	Population	Age	Population
0	8717	45	3984
		46	3758
1	8050	47	3725
2	7634	48	3384
3	7385	49	3504
4	6991	50	3580
5	6969	51	3202
6	6685	52	3194
7	6935	53	2933
8	6830	54	2892
9	7498	55	2891
10	7330	56	2698
11	6752	57	2479
12	6463	58	2325
13	6698	59	2199
14	6923	60	1972
15	7359	61	1694
16	7417	62	1660
17	7580	63	1394
18	6934	64	1375
19	7690	65	1289
20	8438	66	1099
21	8709	67	980
22	8922	68	959
23	9260	69	864
24	9729	70	767
25	10008	71	666
26	9925	72	625
27	10096	73	531
28	9168	74	520
29	9345	75	475
30	9440	76	411
31	8671	77	370
32	8810	78	289
33	8361	79	298
34	6634	80	229
35	6753	81	154
36	6753	82	156
37	6519	83	123
38	5613	84	107
39	5564	85 +	618
40	5120		
41	4654	Total	400,481*
42	4451		
43	4285		
44	4060		

*Age counts are based upon preliminary population totals.

Table II.7
Total Population By Place and Census Area, 1960 to 1980, State of Alaska

Subdivisions	1980	1970	1960
The State[1]	401 851	302 583	226 167
Aleutian Islands Census Area[2]	7 768	...	...
Aleutian Islands census subarea	7 768	...	...
Adak Station (CDP)	3 315	2 249	...
Akutan city[3]	169	...	...
Atka (CDP)	93	88	119
Attu (CDP)	29	...	...
Cold Bay (CDP)	228	256	86
False Pass (CDP)	70	62	41
King Cove city	460	283	290
Nelson Lagoon (CDP)	59	43	...
Nikolski (CDP)	50	57	92
St. George (CDP)	152	163	...
St. Paul city[3]	551	...	...
Sand Point city	625	360	...
Shemya Station (CDP)	600	1 131	...
Unalaska city	1 322	342	218
Anchorage Borough[3]	174 431	126 385	...
Anchorage census subarea	174 431	...	...
Anchorage city[3]	174 431	48 081	44 237
Bethel Census Area[4]	10 999	...	...
Aniak census subarea	1 301	...	...
Aniak city[4]	341	...	...
Chuathbaluk city[4]	105	...	...
Crooked Creek (CDP)	108	59	92
Lime Village (CDP)	48	25	...
Lower Kalskag city	246	183	...
Red Devil (CDP)	39	81	152
Sleetmute (CDP)	107	109	122
Sparrevohn Station (CDP)	26	...	...
Stony River (CDP)	62	74	...
Upper Kalskag city[4]	129	...	...
Lower Kuskokwim census subarea	9 698	...	...
Akiachak city[4]	438	...	...
Akiak city[4]	198	...	...
Akolmiut city[4]	641	526	...
Atmautluak city[4]	219	...	...
Bethel city	3 576	2 416	1 258
Cape Newenham (CDP)	43	...	...
Chefornak city[4]	230	...	...
Eek city[4]	228	...	...
Goodnews Bay city[4]	168	...	...
Kipnuk (CDP)	371	325	221
Kongiganak (CDP)	239	190	...
Kwethluk city[4]	454	...	...
Kwigillingok (CDP)	354	148	334
Mekoryuk city	160	249	...
Napakiak city[4]	262	...	...
Napaskiak city[4]	244	...	...
Newtok city (pt.)[4]	131	...	...
Nightmute city[4]	119	...	...
Oscarville (CDP)	56	41	51
Platinum city[4]	55	...	...
Quinhagak city[4]	412	...	...
Toksook Bay city[4]	333	...	...
Tuluksak city[4]	236	...	...
Tuntutuliak (CDP)	216	158	144
Tununak city[4]	298	...	...
Bristol Bay Borough	1 094	1 147	...
Bristol Bay census subarea	1 094	...	...
King Salmon (CDP)	545	202	227
Naknek (CDP)	318	318	249
South Naknek (CDP)	145	154	142
Dillingham Census Area[5]	4 616	...	...
Dillingham census subarea	4 616	...	...
Aleknagik city[5]	154	...	...
Chignik (CDP)	178	83	99
Chignik Lagoon (CDP)	48	...	...
Chignik Lake (CDP)	138	117	107
Clark's Point city[5]	79	...	...
Dillingham city	1 563	914	...
Egegik (CDP)	75	148	150
Ekwok city[5]	77	...	...
Igiugig (CDP)	33	36	36
Iliamna (CDP)	94	58	47
Ivanof Bay (CDP)	40	48	...
Kokhanok (CDP)	83	88	57
Koliganek (CDP)	117	142	100
Levelock (CDP)	79	74	88
Manokotak city[5]	294	...	...
Newhalen city[5]	87	...	...
New Stuyahok city[5]	331	...	...
Nondalton city[5]	173	...	...
Pedro Bay (CDP)	33	65	53
Perryville (CDP)	111	94	111
Pilot Point (CDP)	66	68	61
Portage Creek (CDP)	48	...	...
Port Heiden city[5]	92	...	...
Togiak city	470	383	...
Twin Hills (CDP)	70	67	...
Fairbanks North Star Borough[6]	53 983	45 864	...
Eielson Reservation census subarea	5 320	...	...
Eielson AFB (CDP)	5 232	6 149	...
Fairbanks North Star census subarea[6]	48 663	...	...
Big Horn (CDP)	360	...	...
College (CDP)	4 043	3 434	1 755
Ester (CDP)	149	266	81
Fairbanks city[6]	22 645	14 771	13 311
Fox (CDP)	123	...	...

Subdivisions	1980	1970	1960
Fairbanks North Star Borough—Con.			
Fairbanks North Star census subarea—Con.			
Harding Lake (CDP)	38	...	...
Moose Creek (CDP)	510	...	...
Murphy Dome (CDP)	72	...	...
North Pole city[6]	724	265	358
Salcha (CDP)	319	...	...
Two Rivers (CDP)	359	...	...
Haines Borough[7]	1 680	...	...
Haines census subarea	1 680	...	...
Haines city[7]	993	463	392
Juneau Borough[8]	19 528	13 556	...
Juneau census subarea	19 528	...	...
Juneau city[8]	19 528	6 050	6 797
Kenai Peninsula Borough[9]	25 282	...	...
Kenai–Cook Inlet census subarea	22 473	...	...
Anchor Point (CDP)	226	102	171
Clam Gulch (CDP)	50	47	...
Cooper Landing (CDP)	116	31	88
Fritz Creek (CDP)	302	27	...
Halibut Cove (CDP)	47	44	25
Homer city	2 209	1 083	...
Hope (CDP)	103	51	44
Jakolof Bay (CDP)	36	...	...
Kachemak city	403	76	...
Kalifonsky (CDP)	92	...	...
Kasilof (CDP)	201	71	89
Kenai city	4 324	3 533	...
Moose Pass (CDP)	76	53	136
Nikishka (CDP)	1 109	...	...
Ninilchik (CDP)	341	134	189
Salamatof (CDP)	334	...	...
Seldovia city	479	437	460
Soldotna city[9]	2 320	1 202	...
Sterling (CDP)	919	30	115
Tyonek (CDP)	239	232	187
Seward census subarea	2 809	...	...
English Bay (CDP)	124	58	78
Port Graham (CDP)	161	107	139
Portlock (CDP)	31	...	...
Seward city[9]	1 843	1 587	1 891
Ketchikan Gateway Borough[10]	11 316	10 041	...
Ketchikan census subarea	11 316	...	...
Clover Pass (CDP)	451	261	169
Herring Cove (CDP)	99	114	126
Ketchikan city[10]	7 198	6 994	6 483
Ketchikan East (CDP)	387	...	...
Mountain Point (CDP)	396	459	372
North Tongass Highway (CDP)	1 722	...	...
Pennock Island (CDP)	90	78	...
Saxman city	273	135	...
Saxman East (CDP)	411	...	...
Kobuk Census Area[11]	4 831	...	...
Kobuk census subarea	4 831	...	...
Ambler city[11]	192	...	...
Buckland city	177	104	...
Deering city[11]	150	...	...
Kiana city	345	278	...
Kivalina city	241	188	...
Kobuk city[11]	62	...	...
Kotzebue city[11]	2 054	1 696	(NA)
Noatak (CDP)	273	293	275
Noorvik city	492	462	...
Selawik city	361	429	...
Shungnak city	202	165	...
Kodiak Island Borough[12]	9 939	9 409	...
Kodiak Island census subarea[12]	8 569	...	...
Akhiok city[12]	105	...	...
Karluk (CDP)	96	98	129
Kodiak city[12]	4 756	3 798	2 628
Larsen Bay city[12]	168	...	...
Old Harbor city	340	290	...
Ouzinkie city	173	160	...
Port Lions city	215	227	...
Kodiak Station census subarea	1 370	...	...
Kodiak Station (CDP)	1 370	3 052	...
Matanuska-Susitna Borough[13]	17 816	6 509	...
Matanuska-Susitna census subarea	17 816	...	...
Big Lake (CDP)	410	36	74
Bodenburg Butte (CDP)	998	...	...
Houston city[13]	370	69	...
Montana (CDP)	40	33	39
Palmer city[13]	2 141	1 140	1 181
Sutton (CDP)	182	76	162
Talkeetna (CDP)	264	182	76
Wasilla city[13]	1 559	...	...
Willow (CDP)	139	38	78
Nome Census Area[14]	6 537	5 749	6 091
Nome census subarea	6 537	...	...
Brevig Mission city	138	123	...
Diomede city[14]	139	...	...
Elim city[14]	211	...	...
Gambell city	445	372	...
Golovin city[14]	87	...	...
Koyuk city[14]	188	...	...
Nome city	2 301	2 357	2 316
Perkinsville (CDP)	33	...	...

See footnotes at end of table.

Table II.7
Total Population By Place and Census Area, 1960 to 1980, State of Alaska
(Continued)

Subdivisions	1980	1970	1960
Nome Census Area—Con.			
Nome census subarea—Con.			
Port Clarence (CDP)	29	...	...
St. Michael city	239	207	...
Savoonga city	491	364	...
Shaktoolik city[14]	164	151	...
Shishmaref city[14]	394	267	...
Stebbins city	331	231	...
Teller city	212	220	...
Unalakleet city[14]	623	...	...
Wales city	133	131	...
White Mountain city	125	87	...
North Slope Borough[15]	4 199	...	...
Barrow–Point Hope census subarea	3 784	...	...
Anaktuvuk Pass city	203	99	(NA)
Atkasook (CDP)	107	...	...
Barrow city	2 207	2 104	...
Cape Lisburne (CDP)	36	83	...
Nuiqsut city[15]	208	...	...
Point Hope city	464	386	...
Point Lay (CDP)	68	...	...
Wainwright city	405	315	...
Prudhoe Bay–Kaktovik census subarea	415	...	...
Deadhorse (CDP)	64	163	...
Kaktovik city[15]	165	...	...
Prudhoe Bay (CDP)	50	49	...
Prince of Wales–Outer Ketchikan Census Area[16]	3 822	...	...
Outer Ketchikan census subarea	1 333	...	...
Annette (CDP)	139	195	337
Hyder (CDP)	77	49	32
Metlakatla (CDP)	1 056	1 050	798
Meyers Chuck (CDP)	50	37	27
Prince of Wales census subarea	2 489	...	...
Cape Pole (CDP)	29	123	92
Coffman Cove (CDP)	193	...	...
Craig city[16]	527	272	273
Hydaburg city	298	214	251
Kasaan city[16]	25	...	...
Klawock city	316	213	251
North Whale Pass (CDP)	90	...	...
Point Baker (CDP)	90	...	...
Thorne Bay (CDP)	320	443	...
Sitka Borough[17]	7 803	...	...
Sitka census subarea	7 803	...	...
Sitka city[17]	7 803	3 370	3 237
Skagway–Yakutat–Angoon Census Area[18]	3 478	...	...
Angoon census subarea	712	...	...
Angoon city[18]	465	400	...
Tenakee Springs city[14]	138	...	...
Hoonah–Yakutat census subarea	1 817	...	...
Elfin Cove (CDP)	28	49	...
Gustavus (CDP)	98	64	107
Hoonah city	680	748	686
Pelican city	180	133	135
Yakutat city[18]	449	190	230
Klukwan census subarea	135	...	...
Klukwan (CDP)	135	103	112
Skagway census subarea	814	...	...
Skagway city[18]	768	675	659
Southeast Fairbanks Census Area[19]	5 676	...	...
Southeast Fairbanks census subarea	5 676	...	...
Big Delta (CDP)	285	...	...
Chicken (CDP)	37	...	...
Delta Junction city[19]	945	703	...
Dot Lake (CDP)	67	42	56
Eagle city	110	36	92
Eagle Village (CDP)	54	...	...
Fort Greely (CDP)	1 635	1 820	...
Healy Lake (CDP)	33	...	...
Northway (CDP)	73	40	196
Northway Village (CDP)	112	...	...
Tanacross (CDP)	117	84	102
Tetlin (CDP)	107	114	122
Tok (CDP)	589	214	129
Valdez–Cordova Census Area[20]	8 348	...	...
Copper River census subarea	2 721	...	...
Chistochina (CDP)	55	33	28
Chitina (CDP)	42	38	31
Copper Center (CDP)	213	206	151
Gakona (CDP)	87	88	33
Glennallen (CDP)	511	363	169
Gulkana (CDP)	104	53	...
Lower Tonsina (CDP)	40	...	...
Mentasta Lake (CDP)	59	68	...
Paxson (CDP)	30	...	...
Slana (CDP)	49	...	...
Tazlina (CDP)	31	...	...
Tonsina (CDP)	135	...	...
Cordova census subarea	2 241	...	...
Cordova city[20]	1 879	1 164	1 128
Eyak (CDP)	47	...	...
Prince William Sound census subarea	3 386	...	...
Tatitlek (CDP)	68	111	96
Valdez city[20]	3 079	1 005	555
Whittier city[20]	198	130	...

Subdivisions	1980	1970	1960
Wade Hampton Census Area[21]	4 665	3 917	3 128
Wade Hampton census subarea	4 665	...	...
Alakanuk city[21]	522	414	278
Chevak city	466	387	...
Emmonak city[21]	567	439	...
Fortuna Ledge city[21]	262	...	...
Hooper Bay city	627	490	...
Kotlik city[21]	293	...	...
Mountain Village city	583	419	...
Newtok city (pt.)[21]	-	...	...
Pilot Station city	325	290	...
Pitkas Point (CDP)	88	70	28
Russian Mission city[21]	169	...	...
St. Mary's city	382	384	...
Scammon Bay city	250	166	...
Sheldon Point city[21]	103	...	...
Wrangell–Petersburg Census Area[22]	6 167	...	...
Petersburg census subarea	3 804	...	...
Kake city[22]	555	448	455
Kupreanof city[22]	47	...	...
Petersburg city[22]	2 821	2 042	1 502
Port Alexander city[22]	86	36	18
Wrangell census subarea	2 363	...	...
Wrangell city[22]	2 184	2 029	1 315
Yukon–Koyukuk Census Area[23]	7 873	...	...
Koyukuk–Middle Yukon census subarea	5 323	...	...
Allakaket city[15]	163	...	...
Anderson city[23]	517	362	...
Campion Station (CDP)	62	...	...
Cantwell (CDP)	89	62	85
Dunbar (CDP)	50	...	...
Evansville (CDP)	94	57	...
Galena city[23]	765	...	...
Healy (CDP)	334	79	67
Hughes city[23]	73	...	...
Huslia city	188	159	...
Indian Mountain (CDP)	27	...	...
Kaltag city	247	206	...
Koyukuk city[23]	98	...	...
McKinley Park (CDP)	32	...	...
Monley Hot Springs (CDP)	61	34	72
Minto (CDP)	153	168	161
Nenana city	470	382	286
Nulato city	350	308	...
Rampart (CDP)	50	36	49
Ruby city[23]	197	...	...
Stevens Village (CDP)	96	74	...
Sunfrana (CDP)	56	67	81
Tanana city	388	406	...
Usibelli Mine (CDP)	53	65	...
McGrath–Holy Cross census subarea	1 343	...	...
Anvik city	114	83	...
Grayling city	209	139	...
Holy Cross city	241	199	...
McGrath city[23]	355	...	...
Nikolai city[23]	91	...	...
Shageluk city[23]	131	...	...
Takotna (CDP)	48	...	...
Tatalina Station (CDP)	46	...	...
Telida (CDP)	33	...	...
Yukon Flats census subarea	1 207	...	...
Arctic Village (CDP)	111	85	...
Beaver (CDP)	66	101	101
Birch Creek (CDP)	32	...	...
Central (CDP)	36	26	28
Chalkyitsik (CDP)	100	130	57
Circle (CDP)	81	54	41
Fort Yukon city	619	448	...
Venetie (CDP)	132	112	107

NOTE: In Alaska, the county equivalents are the organized boroughs together with the "census areas" which were developed for general statistical purposes by the State of Alaska and the Census Bureau.

[1]THE STATE. The boundaries of most county equivalents do not correspond to those of 1970--approximate 1970 populations for the areas as presently constituted are shown in the footnotes. A number of municipalites returned as unincorporated places in 1970 have corporate limits which differ from those assigned in 1970; therefore the 1970 populations shown in the footnotes may differ from those published in the 1970 volumes.

[2]ALEUTIAN ISLANDS CENSUS AREA. The 1970 population for the area now comprising the Aleutian Islands Census Area was approximately 7,834. Akutan and St. Paul cities were incorporated (1970 populations: 101 and 478, respectively).

[3]ANCHORAGE BOROUGH. Anchorage city was merged with the balance of Anchorage Census Division, including the cities of Basher, Girdwood, and Glen Alps (combined 1970 population: 126,385). Anchorage Borough is equivalent to the area returned in 1970 as Anchorage Census Division.

[4]BETHEL CENSUS AREA. The 1970 population for the area now comprising the Bethel Census Area was approximately 8,917. Annexations were made by Akolmiut, Chefornak, Goodnews Bay, and Tuluksak cities. The 1970 populations of the incorporating

Table II.7
Total Population By Place and Census Area, 1960 to 1980, State of Alaska
(Continued)

places were: Aniak (205), Chuathbaluk (100), Upper Kalskag (122), Aktachak (312), Akiak (184), Atmautluak (0), Chefornak (146), Eek (186), Goodnews Bay (218), Kwethluk (408), Napakiak (259), Napaskiak (188), Nightmute (127), Platinum (57), Quinhagak (340), Toksook Bay (257), Tuluksak (195), and Tununak (274). Newtok was incorporated in Bethel and Wade Hampton census areas (the 1970 population total was 114, all of which was in Bethel Census Area.)

[5]DILLINGHAM CENSUS AREA. The 1970 population for the area now comprising the Dillingham Census Area was approximately 3,872. The 1970 populations of the incorporating cities were: Aleknagik (215), Clarks Point (95), Ekwok (103), Manokotak (214), Newhalen (88), New Stuyahok (216), Nondalton (184), and Port Heiden (75).

[6]FAIRBANKS NORTH STAR BOROUGH. Wainwright reservation was added to the former Fairbanks North Star Borough to form the Fairbanks North Star census subarea (combined 1970 population: 39,715). The 1970 population of the Eielson Reservation census subarea was 6,149. The two subareas form the new Fairbanks North Star Borough. Annexations were made by Fairbanks and North Pole cities.

[7]HAINES BOROUGH. The 1970 population for the area now comprising the Haines Borough was approximately 1,401. Annexations were made by Haines city. Port Chilkoot city was merged with Haines city (combined 1970 population: 683).

[8]JUNEAU BOROUGH. Juneau city was merged with the balance of Greater Juneau Borough including Douglas city (combined 1970 population: 13,556).

[9]KENAI PENINSULA BOROUGH. The 1970 population for the area now comprising the Kenai Peninsula Borough was approximately 16,586. Annexations were made by Soldotna and Seward cities.

[10]KETCHIKAN GATEWAY BOROUGH. Annexations were made by Ketchikan city.

[11]KOBUK CENSUS AREA. The 1970 population for the area now comprising the Kobuk Census Area was approximately 4,048. Annexations were made by Kotzebue city. The 1970 populations of the incorporating cities were: Ambler (176), Deering (85) and Kobuk (165).

[12]KODIAK ISLAND BOROUGH. Annexations were made by Kodiak city. Akhiok and Larsen Bay cities were incorporated (1970 populations: 115 and 126, respectively).

[13]MATANUSKA-SUSITNA BOROUGH. Long Island city and Bay City city were disincorporated. Wasilla city was incorporated (1970 population: 376). Annexations were made by Houston, Palmer, and Wasilla cities. Area was detached by Wasilla city.

[14]NOME CENSUS AREA. Detachments were made by Shishmaref city. The 1970 populations of the incorporating places were: Diomede (84), Elim (174), Golovin (117), Koyuk (122), and Unalakleet (470). Shaktoolik city was returned as Shaktolik in 1970.

[15]NORTH SLOPE BOROUGH. The 1970 population for the area now comprising the North Slope Borough was approximately 3,451. Nuiqsut and Kaktovik cities were incorporated (1970 populations: 0 and 123, respectively).

[16] PRINCE OF WALES-OUTER KETCHIKAN CENSUS AREA. The 1970 population for the area now comprising the Prince of Wales-Outer Ketchikan Census Area was approximately 3,782. Annexations were made by Craig city. Kasaan city was incorporated (1970 population: 30).

[17]SITKA BOROUGH. The 1970 population for the area now comprising Sitka Borough was approximately 6,073. Sitka city was merged with Sitka Census Division, which was redefined since 1970. Port Alexander city was transferred to Wrangell-Petersburg Census Area.

[18]SKAGWAY-YAKUTAT-ANGOON CENSUS AREA. The 1970 population for the area now comprising Skagway-Yakutat-Angoon Census Area was approximately 2,792. Annexations were made by Angoon, Yakutat, and Skagway cities. Tenakee Springs city was incorporated (1970 population: 93).

[19]SOUTHEAST FAIRBANKS CENSUS AREA. The 1970 population for the area now comprising Southeast Fairbanks Census Area was approximately 4,308. Annexations were made by Delta Junction city. Donnelly city was disincorporated.

[20]VALDEZ-CORDOVA CENSUS AREA. The 1970 population for the area now comprising the Valdez-Cordova Census Area was approximately 4,977. Annexations were made by Cordova, Valdez, and Whittier cities.

[21]WADE HAMPTON CENSUS AREA. The 1970 populations of the incorporating cities were: Fortuna Ledge (176), Kotlik (228), Russian Mission (147), and Sheldon Point (125). Newtok incorporated in Bethel and Wade Hampton census areas; the portion in Wade Hampton Census Area was unpopulated in 1970. Emmonak city was returned as Emanguk in 1970.

[22]WRANGELL-PETERSBURG CENSUS AREA. The 1970 population for the area now comprising the Wrangell-Petersburg Census Area was approximately 4,920. Annexations were made by Kake, Petersburg, and Wrangell cities. Kupreanof city was incorporated (1970 population: 36). Port Alexander city was transferred from the Sitka Census Division.

[23]YUKON-KOYUKUK CENSUS AREA. The 1970 population for the area now comprising the Yukon-Koyukuk Census Area was approximately 7,045. Annexations were made by Anderson city. The 1970 populations of the incorporating places were: Allakaket (174), Galena (581), Hughes (85), Koyukuk (114), Ruby (147), McGrath (279), Nikolai (112), and Shageluk (167).

Table II.8
Total Population By an Alphabetical Ordering of Place, 1960 to 1980, State of Alaska

(For changes in boundaries of incorporated places since 1970, see Table II.7

Incorporated Places Census Designated Places	Boroughs or Census Areas	1980	1970	1960
Adak Station (CDP)	Aleutian Islands	3 315	2 249	...
Akhiok city	Kodiak Island	105	...	...
Akiachak city	Bethel	438	...	...
Akiak city	Bethel	198	...	...
Akolmiut city	Bethel	641	526	...
Akutan city	Aleutian Islands	169	...	...
Alakanuk city	Wade Hampton	522	414	278
Aleknagik city	Dillingham	154	...	...
Allakaket city	Yukon-Koyukuk	163	...	...
Ambler city	Kobuk	192	...	...
Anaktuvuk Pass city	North Slope	203	99	(NA)
Anchorage city	Anchorage	174 431	48 081	44 237
Urban part		170 247	...	...
Anchor Point (CDP)	Kenai Peninsula	226	102	171
Anderson city	Yukon-Koyukuk	517	362	...
Angoon city	Skagway-Yakutat-Angoon	465	400	...
Aniak city	Bethel	341	...	...
Annette (CDP)	Prince of Wales-Outer Ketchikan	139	195	337
Anvik city	Yukon-Koyukuk	114	83	...
Arctic Village (CDP)	Yukon-Koyukuk	111	85	...
Atka (CDP)	Aleutian Islands	93	88	119
Atkasook (CDP)	North Slope	107	...	...
Atmautluak city	Bethel	219	...	...
Attu (CDP)	Aleutian Islands	29	...	...
Barrow city	North Slope	2 207	2 104	...
Beaver (CDP)	Yukon-Koyukuk	66	101	101
Bethel city	Bethel	3 576	2 416	1 258
Big Delta (CDP)	Southeast Fairbanks	285	...	...
Big Horn (CDP)	Fairbanks North Star	360	...	...
Big Lake (CDP)	Matanuska-Susitna	410	36	74
Birch Creek (CDP)	Yukon-Koyukuk	32	...	...
Bodenburg Butte (CDP)	Matanuska-Susitna	988	...	...
Brevig Mission city	Nome	138	123	...
Buckland city	Kobuk	177	104	...
Campion Station (CDP)	Yukon-Koyukuk	62	...	...
Cantwell (CDP)	Yukon-Koyukuk	89	62	85
Cape Lisburne (CDP)	North Slope	36	83	...
Cape Newenham (CDP)	Bethel	43	...	...
Cape Pole (CDP)	Prince of Wales-Outer Ketchikan	29	123	92
Central (CDP)	Yukon-Koyukuk	36	26	28
Chalkyitsik (CDP)	Yukon-Koyukuk	100	130	57
Chefornak city	Bethel	230	...	...
Chevak city	Wade Hampton	466	387	...
Chicken (CDP)	Southeast Fairbanks	37	...	...
Chignik (CDP)	Dillingham	178	83	99
Chignik Lagoon (CDP)	Dillingham	48	...	...
Chignik Lake (CDP)	Dillingham	138	117	107
Chistochina (CDP)	Valdez-Cordova	55	33	28
Chitina (CDP)	Valdez-Cordova	42	38	31
Chuathbaluk city	Bethel	105	...	...
Circle (CDP)	Yukon-Koyukuk	81	54	41
Clam Gulch (CDP)	Kenai Peninsula	50	47	...
Clark's Point city	Dillingham	79	...	...
Clover Pass (CDP)	Ketchikan Gateway	451	253	169
Coffman Cove (CDP)	Prince of Wales-Outer Ketchikan	193	...	...
Cold Bay (CDP)	Aleutian Islands	228	256	86
College (CDP)	Fairbanks North Star	4 043	3 434	1 755
Cooper Landing (CDP)	Kenai Peninsula	116	31	88
Copper Center (CDP)	Valdez-Cordova	213	206	151
Cordova city	Valdez-Cordova	1 879	1 164	1 128
Craig city	Prince of Wales-Outer Ketchikan	527	272	273
Crooked Creek (CDP)	Bethel	108	59	92
Deadhorse (CDP)	North Slope	64	163	...
Deering city	Kobuk	150	...	...
Delta Junction city	Southeast Fairbanks	945	703	...
Dillingham city	Dillingham	1 563	914	...
Diomede city	Nome	139	...	...
Dot Lake (CDP)	Southeast Fairbanks	67	42	56
Dunbar (CDP)	Yukon-Koyukuk	50	...	...
Eagle city	Southeast Fairbanks	110	36	92
Eagle Village (CDP)	Southeast Fairbanks	54	...	...
Eek city	Bethel	228	...	...
Egegik (CDP)	Dillingham	75	148	150
Eielson AFB (CDP)	Fairbanks North Star	5 232	6 149	...
Ekwok city	Dillingham	77	...	...
Elfin Cove (CDP)	Skagway-Yakutat-Angoon	28	49	...
Elim city	Nome	211	...	...
Emmonak city	Wade Hampton	567	439	...
English Bay (CDP)	Kenai Peninsula	124	58	78
Ester (CDP)	Fairbanks North Star	149	264	81
Evansville (CDP)	Yukon-Koyukuk	94	57	...
Eyak (CDP)	Valdez-Cordova	47	...	...
Fairbanks city	Fairbanks North Star	22 645	14 771	13 311
False Pass (CDP)	Aleutian Islands	70	62	41
Fort Greely (CDP)	Southeast Fairbanks	1 635	1 820	...
Fortuna Ledge city	Wade Hampton	262	...	...
Fort Yukon city	Yukon-Koyukuk	619	448	...
Fox (CDP)	Fairbanks North Star	123	...	...
Fritz Creek (CDP)	Kenai Peninsula	302	27	...
Gakona (CDP)	Valdez-Cordova	87	88	33
Galena city	Yukon-Koyukuk	765	...	...
Gambell city	Nome	445	372	...
Glennallen (CDP)	Valdez-Cordova	511	363	169

Incorporated Places Census Designated Places	Boroughs or Census Areas	1980	1970	1960
Golovin city	Nome	87	...	...
Goodnews Bay city	Bethel	168	...	...
Grayling city	Yukon-Koyukuk	209	139	...
Gulkana (CDP)	Valdez-Cordova	104	53	...
Gustavus (CDP)	Skagway-Yakutat-Angoon	98	64	107
Haines city	Haines	993	463	392
Halibut Cove (CDP)	Kenai Peninsula	47	44	25
Harding Lake (CDP)	Fairbanks North Star	38	...	...
Healy (CDP)	Yukon-Koyukuk	334	79	67
Healy Lake (CDP)	Southeast Fairbanks	33	...	...
Herring Cove (CDP)	Ketchikan Gateway	99	114	126
Holy Cross city	Yukon-Koyukuk	241	199	...
Homer city	Kenai Peninsula	2 209	1 083	...
Hoonah city	Skagway-Yakutat-Angoon	680	748	686
Hooper Bay city	Wade Hampton	627	490	...
Hope (CDP)	Kenai Peninsula	103	51	44
Houston city	Matanuska-Susitna	370	69	...
Hughes city	Yukon-Koyukuk	73	...	...
Huslia city	Yukon-Koyukuk	188	159	...
Hydaburg city	Prince of Wales-Outer Ketchikan	298	214	251
Hyder (CDP)	Prince of Wales-Outer Ketchikan	77	49	32
Igiugig (CDP)	Dillingham	33	36	36
Iliamna (CDP)	Dillingham	94	58	47
Indian Mountain (CDP)	Yukon-Koyukuk	27	...	...
Ivanof Bay (CDP)	Dillingham	40	48	...
Jakolof Bay (CDP)	Kenai Peninsula	36	...	...
Juneau city	Juneau	19 528	6 050	6 797
Kachemak city	Kenai Peninsula	403	76	...
Kake city	Wrangell-Petersburg	555	448	455
Kaktovik city	North Slope	165	...	...
Kalifonsky (CDP)	Kenai Peninsula	92	...	...
Kaltag city	Yukon-Koyukuk	247	206	...
Karluk (CDP)	Kodiak Island	96	98	129
Kasaan city	Prince of Wales-Outer Ketchikan	25	...	...
Kasilof (CDP)	Kenai Peninsula	201	71	89
Kenai city	Kenai Peninsula	4 324	3 533	...
Ketchikan city	Ketchikan Gateway	7 198	6 994	6 483
Ketchikan East (CDP)	Ketchikan Gateway	387	...	...
Kiana city	Kobuk	345	278	...
King Cove city	Aleutian Islands	460	283	290
King Salmon (CDP)	Bristol Bay	545	202	227
Kipnuk (CDP)	Bethel	371	325	221
Kivalina city	Kobuk	241	188	...
Klawock city	Prince of Wales-Outer Ketchikan	318	213	251
Klukwan (CDP)	Skagway-Yakutat-Angoon	135	103	112
Kobuk city	Kobuk	62	...	...
Kodiak city	Kodiak Island	4 756	3 798	2 628
Kodiak Station (CDP)	Kodiak Island	1 370	3 052	...
Kokhanok (CDP)	Dillingham	83	88	57
Koliganek (CDP)	Dillingham	117	142	100
Kongiganak (CDP)	Bethel	239	190	...
Kotlik city	Wade Hampton	293	246	...
Kotzebue city	Kobuk	2 054	1 696	(NA)
Koyuk city	Nome	188	...	...
Koyukuk city	Yukon-Koyukuk	98	...	...
Kupreanof city	Wrangell-Petersburg	47	...	...
Kwethluk city	Bethel	454	...	...
Kwigillingok (CDP)	Bethel	354	148	334
Larsen Bay city	Kodiak Island	168	...	...
Levelock (CDP)	Dillingham	79	74	88
Lime Village (CDP)	Bethel	48	25	...
Lower Kalskag city	Bethel	246	183	...
Lower Tonsina (CDP)	Valdez-Cordova	40	...	...
McGrath city	Yukon-Koyukuk	355	...	...
McKinley Park (CDP)	Yukon-Koyukuk	32	...	...
Manley Hot Springs (CDP)	Yukon-Koyukuk	61	34	72
Manokotak city	Dillingham	294	...	...
Mekoryuk city	Bethel	160	249	...
Mentasta Lake (CDP)	Valdez-Cordova	59	68	...
Metlakatla (CDP)	Prince of Wales-Outer Ketchikan	1 056	1 050	798
Meyers Chuck (CDP)	Prince of Wales-Outer Ketchikan	50	37	27
Minto (CDP)	Yukon-Koyukuk	153	168	161
Montana (CDP)	Matanuska-Susitna	40	33	39
Moose Creek (CDP)	Fairbanks North Star	510	...	...
Moose Pass (CDP)	Kenai Peninsula	76	53	136
Mountain Point (CDP)	Ketchikan Gateway	396	459	372
Mountain Village city	Wade Hampton	583	419	...
Murphy Dome (CDP)	Fairbanks North Star	72	...	...
Naknek (CDP)	Bristol Bay	318	318	249
Napakiak city	Bethel	262	...	...
Napaskiak city	Bethel	244	...	...
Nelson Lagoon (CDP)	Aleutian Islands	59	43	...
Nenana city	Yukon-Koyukuk	470	382	286
Newhalen city	Dillingham	87	...	...
New Stuyahok city	Dillingham	331	...	...
Newtok city	Total	131	...	...
	Bethel (pt. in)	131	...	...
	Wade Hampton (pt. in)	–	...	...
Nightmute city	Bethel	119	...	...
Nikishka (CDP)	Kenai Peninsula	1 109	...	...
Nikolai city	Yukon-Koyukuk	91	...	...

Table II.8
Total Population By an Alphabetical Ordering of Place, 1960 to 1980, State of Alaska (Continued)

(For changes in boundaries of incorporated places since 1970, see Table II.7

Incorporated Places Census Designated Places	Boroughs or Census Areas	1980	1970	1960
Nikolski (CDP)	Aleutian Islands	50	57	92
Nondalton (CDP)	Kenai Peninsula	341	134	169
Noorvik (CDP)	Kobuk	273	293	275
Nome city	Nome	2 301	[2] 357	2 316
Nondalton city	Dillingham	173	...	...
Noorvik city	Kobuk	492	462	...
North Pole city	Fairbanks North Star	724	265	358
North Tongass Highway (CDP)	Ketchikan Gateway	[1] 722	...	...
Northway (CDP)	Southeast Fairbanks	73	40	196
Northway Village (CDP)	Southeast Fairbanks	112	...	...
North Whale Pass (CDP)	Prince of Wales–Outer Ketchikan	90	...	...
Nuiqsut city	North Slope	208	...	...
Nulato city	Yukon–Koyukuk	350	308	...
Old Harbor city	Kodiak Island	340	290	...
Oscarville (CDP)	Bethel	56	41	51
Ouzinkie city	Kodiak Island	173	160	...
Palmer city	Matanuska–Susitna	2 141	1 140	1 181
Paxson (CDP)	Valdez–Cordova	30	...	...
Pedro Bay (CDP)	Dillingham	33	65	53
Pelican city	Skagway–Yakutat–Angoon	180	133	135
Pennock Island (CDP)	Ketchikan Gateway	90	78	...
Perkinsville (CDP)	Nome	33	...	...
Perryville (CDP)	Dillingham	111	94	111
Petersburg city	Wrangell–Petersburg	2 821	2 042	1 502
Pilot Point (CDP)	Dillingham	66	68	61
Pilot Station city	Wade Hampton	325	290	...
Pitkas Point (CDP)	Wade Hampton	88	70	28
Platinum city	Bethel	55	...	...
Point Baker (CDP)	Prince of Wales–Outer Ketchikan	90	...	...
Point Hope city	North Slope	464	386	...
Point Lay (CDP)	North Slope	68	...	...
Portage Creek (CDP)	Dillingham	48	...	...
Port Alexander city	Wrangell–Petersburg	86	36	18
Port Clarence (CDP)	Nome	29	...	...
Port Graham (CDP)	Kenai Peninsula	161	107	139
Port Heiden city	Dillingham	92	...	...
Port Lions city	Kodiak Island	215	227	...
Portlock (CDP)	Kenai Peninsula	31	...	...
Prudhoe Bay (CDP)	North Slope	50	49	...
Quinhagak city	Bethel	412	...	...
Rampart (CDP)	Yukon–Koyukuk	50	36	49
Red Devil (CDP)	Bethel	39	81	152
Ruby city	Yukon–Koyukuk	197	...	...
Russian Mission city	Wade Hampton	169	...	...
St. George (CDP)	Aleutian Islands	158	163	...
St. Mary's city	Wade Hampton	382	384	...
St. Michael city	Nome	239	207	...
St. Paul city	Aleutian Islands	551	...	...
Salamatof (CDP)	Kenai Peninsula	334	...	...
Salcha (CDP)	Fairbanks North Star	319	...	...
Sand Point city	Aleutian Islands	625	360	...
Savoonga city	Nome	491	364	...
Saxman city	Ketchikan Gateway	273	135	...
Saxman East (CDP)	Ketchikan Gateway	411	...	...
Scammon Bay city	Wade Hampton	250	166	...
Selawik city	Kobuk	361	429	...
Seldovia city	Kenai Peninsula	479	437	460
Seward city	Kenai Peninsula	1 843	1 587	1 891
Shageluk city	Yukon–Koyukuk	131	...	...
Shaktoolik city	Nome	164	151	...
Sheldon Point city	Wade Hampton	103	...	...
Shemya Station (CDP)	Aleutian Islands	600	1 131	...
Shishmaref city	Nome	394	267	...
Shungnak city	Kobuk	202	165	...
Sitka city	Sitka	7 803	3 370	3 237
Skagway city	Skagway–Yakutat–Angoon	768	675	659
Sleetmute (CDP)	Bethel	49	...	...
Soldotna city	Kenai Peninsula	107	109	122
South Naknek (CDP)	Bristol Bay	2 320	1 202	...
Sparrevohn Station (CDP)	Bethel	145	154	142
Stebbins city	Nome	26	...	...
Sterling (CDP)	Kenai Peninsula	331	231	...
Stevens Village (CDP)	Yukon–Koyukuk	919	30	115
Stony River (CDP)	Bethel	96	74	...
Suntrana (CDP)	Yukon–Koyukuk	62	74	...
Sutton (CDP)	Matanuska–Susitna	56	67	81
Takotna (CDP)	Yukon–Koyukuk	182	76	162
Talkeetna (CDP)	Matanuska–Susitna	48	...	...
Tanacross (CDP)	Southeast Fairbanks	264	182	76
Tanana city	Yukon–Koyukuk	117	84	102
Tatalina Station (CDP)	Yukon–Koyukuk	388	[1] 406	...
Tatitlek (CDP)	Valdez–Cordova	46	...	...
Tazlina (CDP)	Valdez–Cordova	68	111	96
Telida (CDP)	Yukon–Koyukuk	31	...	...
Teller city	Nome	33	...	...
Tenakee Springs city	Skagway–Yakutat–Angoon	212	220	...
Tetlin (CDP)	Southeast Fairbanks	138	...	...
Thorne Bay (CDP)	Prince of Wales–Outer Ketchikan	107	114	122
Togiak city	Dillingham	320	443	...
Tok (CDP)	Southeast Fairbanks	470	383	...
Toksook Bay city	Bethel	589	214	129
Tonsina (CDP)	Valdez–Cordova	333	...	...
Tuluksak city	Bethel	135	...	...
Tuntutuliak (CDP)	Bethel	236	...	...
Tununak city	Bethel	216	158	144
Twin Hills (CDP)	Dillingham	298	...	...
Two Rivers (CDP)	Fairbanks North Star	70	67	...
Tyonek (CDP)	Kenai Peninsula	359	...	...
Unalakleet city	Nome	239	232	187
Unalaska city	Aleutian Islands	623	...	...
Upper Kalskag city	Bethel	1 322	[1] 342	218
Usibelli Mine (CDP)	Yukon–Koyukuk	129	...	...
Valdez city	Valdez–Cordova	53	65	...
Venetie (CDP)	Yukon–Koyukuk	3 079	1 005	555
Wainwright city	North Slope	132	112	107
Wales city	Nome	405	315	...
Wasilla city	Matanuska–Susitna	133	131	...
White Mountain city	Nome	1 559	...	...
Whittier city	Valdez–Cordova	125	87	...
Willow (CDP)	Matanuska–Susitna	198	130	...
Wrangell city	Wrangell–Petersburg	139	38	78
Yakutat city	Skagway–Yakutat–Angoon	2 184	2 029	1 315
		449	190	230

Table II.9
1970 and 1980 Population and Housing
By 1980 Census Area
State of Alaska

1980 Census Area	1970 Population	1970 Housing Units	1980 Population	1980 Housing Units
Aleutian Island C A	7834	1263	7768	1704
Anchorage Borough	126385	37670	174431	70363
Bethel Census Area	8917	1966	10999	3297
Bristol Bay Borough	1147	214	1094	369
Dillingham Census Area	3872	1058	4616	1952
Fairbanks North Star Br	45864	12520	53983	22708
Haines Borough	1401	480	1680	743
Juneau Borough	13556	4529	19528	7656
Kenai Peninsula Borough	16586	6069	25282	11740
Ketchikan Gateway Borough	10041	3265	11316	4431
Kobuk Census Area	4048	921	4831	1486
Kodiak Island Borough	9409	2539	9939	3557
Matanuska-Susitna Borough	6509	4221	17816	10098
Nome Census Area	5749	1700	6537	2608
North Slope Borough	3451	601	4199	1158
Prince of Wales-Outer Ketchikan C.A.	3782	1007	3822	1385
Sitka Borough	6073	1899	7803	2694
Skagway-Yakutat-Angoon C.A.	2792	935	3478	1553
Southeast Fairbanks C.A.	4308	1429	5676	2450
Valdez-Cordova C.A.	4977	2388	8348	4145
Wade Hampton C.A.	3917	690	4665	1173
Wrangell-Petersburg C.A.	4920	1635	6167	2363
Yukon-Koyukuk C.A.	7045	1828	7873	3192
State Total	*302583	*90827	*401851	*162825

* Revised, corrected counts.

Table II.10
1970 and 1980 Population
By 1970 Census Divisions
State of Alaska

1970 Census Division	1970	1980
Aleutian Island	8057	8290
Anchorage	*126333	174431
Angoon	503	712
Barrow	*2885	3320
Bethel	*7767	9698
Bristol Bay Borough	1147	1094
Bristol Bay	3485	4094
Cordova-McCarthy	1857	2330
Fairbanks	45864	53983
Haines	1504	1815
Juneau	13556	19528
Kenai-Cook Inlet	14250	22473
Ketchikan	10041	11316
Kobuk	4434	5295
Kodiak	9409	9939

1970 Census Division	1970	1980
Kuskokwim	2306	2644
Matanuska-Susitna	6509	17816
Nome	5749	6537
Outer Ketchikan	1676	1333
Prince of Wales	2106	2489
Seward	2336	2809
Sitka	6109	7889
Skagway-Yakutat	2157	2631
Southeast Fairbanks	4179	5415
Upper Yukon	1684	2030
Valdez-Chitina-Whittier	3098	5976
Wade Hampton	3917	4665
Wrangell-Petersburg	4913	6081
Yukon-Koyukuk	4752	5218
State Total *	*302583	*401851

* Revised, corrected counts.

Table II.11
Total Land Area and Population
By Census Area, 1980
State of Alaska

Boroughs Census Areas	1980 land area		1980		
	Square miles	Square kilometers	Number	Per square mile	Per square kilometer
The State	570 833	1 478 458	401 851	0 7	0 3
Aleutian Islands	10 890	28 205	7 768	0 7	0 3
Anchorage	1 732	4 486	174 431	100 7	38 9
Bethel	36 104	93 509	10 999	0 3	0 1
Bristol Bay	531	1 375	1 094	2 1	0 8
Dillingham	46 042	119 249	4 616	0 1	-
Fairbanks North Star	7 404	19 176	53 983	7 3	2 8
Haines	2 374	6 149	1 680	0 7	0 3
Juneau	2 626	6 801	19 528	7 4	2 9
Kenai Peninsula	16 056	41 585	25 282	1 6	0 6
Ketchikan Gateway	1 242	3 217	11 316	9 1	3 5
Kobuk	31 593	81 826	4 831	0 2	0 1
Kodiak Island	4 796	12 422	9 939	2 1	0 8
Matanuska-Susitna	24 502	63 460	17 816	0 7	0 3
Nome	23 871	61 826	6 537	0 3	0 1
North Slope	90 955	235 574	4 199	-	-
Prince of Wales-Outer Ketchikan	7 660	19 839	3 822	0 5	0 2
Sitka	2 938	7 609	7 803	2 7	1 0
Skagway-Yakutat-Angoon	13 239	34 289	3 478	0 3	0 1
Southeast Fairbanks	24 169	62 598	5 676	0 2	0 1
Valdez-Cordova	39 229	101 603	8 348	0 2	0 1
Wade Hampton	17 816	46 143	4 665	0 3	0 1
Wrangell-Petersburg	5 965	15 449	6 167	1 0	0 4
Yukon-Koyukuk	159 099	412 066	7 873	-	-

Table II.12
Number of Households
By Size and Type, 1980
State of Alaska

1 Person:	
Male Householder	16744
Female Householder	9723
2 or More Persons:	
Married-Couple Family	80344
Other Family:	
Male Householder, No Wife Present	4948
Female Householder, No Husband Present	10272
Nonfamily Household:	
Male Householder	8543
Female Householder	2889

Table II.13
Number of Persons
Total and 65 Years and Over
In Households By Type, and In Group Quarters, 1980
State of Alaska

	Total	65 Years And Over
In Family Household:		
Householder	95564	4243
Spouse	80344	2116
Other Relatives	154871	1200
Nonrelatives	6895	115
In Nonfamily Household:		
Male Householder	23287	1250
Female Householder	12612	1716
Nonrelatives	12218	128
In Group Quarters:		
Inmate of Institution	2165	706
Other	14095	73

Table II.14
Number of Persons Under 18 Years in Households By Type, and in Group Quarters, 1980
State of Alaska

In Household:	
Householder or Spouse	384
Own Child of Householder:	
In Married-Couple Family	102138
In Other Family (Male or Female Householder, No Spouse Present)	18268
Other Relatives	6671
Nonrelatives	2462
In Group Quarters:	
Inmate of Institution	454
Other	368

Table II.15
Number of Households By Size, Type and Membership of Persons 60 Years and Over and 65 Years and Over, 1980
State of Alaska

	With 1 or More Persons 60 Years and Over	With 1 or More Persons 65 Years and Over
1 Person	4178	2758
2 or More Persons:		
Family Household	9812	5838
Nonfamily Household	503	282

Table II.16
Number of Persons in Housing Units With More Than One Person Per Room By Tenure Type, 1980
State of Alaska

Total	Owner Occupied	Renter Occupied
67398	43687	23711

Table II.17
Number of Households By Tenure, Persons Per Room, and Plumbing Facilities, 1980
State of Alaska

	Total	Owner Occupied	Renter Occupied
1.00 or Less	118238	68734	49504
Lacking Complete Plumbing For Exclusive Use	8232	4925	3307
1.01 or More	13225	7929	5296
Lacking Complete Plumbing For Exclusive Use	5439	4029	1410

Table II.18
Number of Persons By Type of Plumbing Facilities In Housing Unit and Persons Per Room, 1980
State of Alaska

Total	385591
Complete Plumbing	
For Exclusive Use	342096
With 1.01 or More	40350
Lacking Complete Plumbing	
For Exclusive Use	43495
With 1.01 or More	27048

Table II.19
Number of Year-Round Housing Units By Tenure, Occupancy Status, and Plumbing Facilities, 1980
State of Alaska

Total	154171
Complete Plumbing	
For Exclusive Use	135398
Lacking Complete Plumbing	
For Exclusive Use	18773
Total Occupied	131463
Complete Plumbing	
For Exclusive Use	117792
Lacking Complete Plumbing	
For Exclusive Use	13671
Owner Occupied	76663
Complete Plumbing	
For Exclusive Use	67709
Lacking Complete Plumbing	
For Exclusive Use	8954
Renter Occupied	54800
Complete Plumbing	
For Exclusive Use	50083
Lacking Complete Plumbing	
For Exclusive Use	4717
Vacant	22708
Complete Plumbing	
For Exclusive Use	17606
Lacking Complete Plumbing	
For Exclusive Use	5102

Table II.20
Average of Value of Owner-Occupied and Vacant-For-Sale-Only, Noncondominium and Condominium Housing Units By Value, 1980
State of Alaska

	Owner Occupied	Vacant For Sale Only
Noncondominium:		
Total	51834	1512
Mean Value or Price Asked	$77500	$68500
Condominium:		
Total	2736	574
Mean Value or Price Asked	$72500	$69200

Table II.21
Number of Owner-Occupied Noncondominium Housing Units By Value, 1980
State of Alaska

Less than $10,000	2048
$10,000 to $14,999	1074
$15,000 to $19,999	1229
$20,000 to $24,999	1362
$25,000 to $29,999	1107
$30,000 to $34,999	1156
$35,000 to $39,999	1109
$40,000 to $49,999	2774
$50,000 to $79,999	16704
$80,000 to $99,999	12106
$100,000 to $149,999	8978
$150,000 to $199,999	1454
$200,000 or More	733
Median	$75,200

Table II.22
Number of Renter-Occupied Housing Units By Contract Rent, 1980
State of Alaska

With Cash Rent:		
Less than $50	720	
$50 to $99	1543	
$100 to $119	931	
$120 to $139	643	
$140 to $149	211	
$150 to $159	941	
$160 to $169	356	MEDIAN CONTRACT RENT FOR SPECIFIED RENTER-OCCUPIED HOUSING UNITS PAYING CASH RENT
$170 to $199	1623	
$200 to $249	5219	
$250 to $299	6036	
$300 to $399	14831	
$400 to $499	9209	
$500 or More	5406	
No Cash Rent	5659	$338

Table II.23
Selected Housing Characteristics By Census Area, 1980
State of Alaska

	Year-Round Housing Units											Vacancy Rate	
					Occupied								
					Owner			Renter					
	Total Housing Units	Total	Median Rooms	Percent Lacking Complete Plumbing For Exclusive Use	Total	Lacking Complete Plumbing For Exclusive Use	Median Value (Dollars), Specified Owner	Total	Lacking Complete Plumbing For Exclusive Use	Median Contract Rent (Dollars), Specified Renter	Home-Owner	Rental
Alaska	162825	154171	4.5	12.2	76663	8954	76300	54800	4717	340	3.8	15.4
Aleutian Islands	1704	1657	4.5	9.5	468	54	48600	1130	87	244	0.2	1.5
Anchorage	70363	66654	4.8	1.5	34195	281	86200	29275	572	360	4.1	17.2
Bethel	3297	3081	2.7	72.1	1748	1458	30300	936	447	222	3.1	10.5
Bristol Bay	369	294	4.0	25.9	119	32	45300	127	22	300	2.5	8.6
Dillingham	1952	1410	3.7	46.5	784	408	27400	476	127	346	2.1	7.4
Fairbanks North Star	27708	27105	4.4	10.2	9349	914	69900	8875	639	312	4.2	18.7
Haines	743	719	4.1	23.5	374	72	48300	198	31	226	2.3	13.5
Juneau	7886	7516	4.8	4.0	4444	138	84100	2991	119	386	2.2	5.5
Kenai Peninsula	11740	10432	4.3	13.4	8096	687	64100	2450	297	300	3.7	25.1
Ketchikan Gateway	4431	4263	4.4	4.2	2275	45	72700	1710	104	327	1.3	5.6
Kobuk	1466	1332	3.0	51.8	606	381	35700	442	156	350	1.1	6.2
Kodiak Island	3557	3444	4.2	14.4	1648	177	68500	1379	91	385	2.3	4.2
Matanuska-Susitna	10098	7513	4.4	23.2	4454	584	69500	1245	257	274	3.6	20.3
Nome	2608	2049	3.4	62.4	910	615	29800	831	418	294	2.7	7.6
North Slope	1158	1139	3.3	76.8	456	438	45000	524	332	291	4.4	10.6
Prince of Wales-Outer Ketchikan	1385	1309	4.3	12.9	632	85	37400	489	31	154	3.2	12.2
Sitka	2694	2645	4.6	4.5	1291	64	66700	1149	31	353	1.3	6.4
Skagway-Yakutat-Angoon	1553	1533	4.3	23.7	631	93	52400	456	95	225	1.6	9.7
Southeast Fairbanks	2450	2112	4.0	32.1	653	328	34100	813	115	265	1.8	11.4
Valdez-Cordova	4145	3716	4.0	25.6	1632	298	75800	1057	184	362	5.0	15.7
Wade Hampton	1173	1138	3.0	77.7	781	630	17300	166	94	274	2.0	13.1
Wrangell-Petersburg	2363	2292	4.5	9.3	1325	131	58900	747	61	320	1.1	10.2
Yukon-Koyukuk	3192	2798	2.8	67.2	1496	1040	19700	784	436	157	3.3	12.5

Table II.24
Number of Persons in Households and Group Quarters, Total Households and Average Number of Persons Per Household, By Municipality, 1980
State of Alaska

	PERSONS IN HOUSEHOLDS	ERSONS IN GROUP QUARTERS	TOTAL HOUSE-HOLDS	PERSONS PER HOUSE-HOLD
ALASKA	384275	16206	131068	2.93
AKHIOK	105	–	27	3.89
AKIACHAK	436	–	87	5.03
AKIAK	198	–	36	5.50
AKOLMIUT	641	–	129	4.97
AKUTAN	69	100	17	4.06
ALAKANUK	522	–	105	4.97
ALEKNAGIK	154	–	38	4.05
ALLAKAKET	163	–	46	3.54
AMBLER	192	–	48	4.00
ANAKTUVUK PASS	203	–	51	3.98
ANCHORAGE	168169	4848	60042	2.80
ANDERSON	390	127	118	3.31
ANGOON	465	–	110	4.23
ANIAK	341	–	111	3.07
ANVIK	114	–	36	3.17
ATMAUTLUAK	219	–	47	4.66
BARROW	2204	3	607	3.63
BETHEL	3527	49	1083	3.26
BREVIG MISSION	138	–	32	4.31
BUCKLAND	177	–	39	4.54
CHEFORNAK	230	–	38	6.05
CHEVAK	466	–	92	6.07
CHUATHBALUK	105	–	26	4.04
CLARK'S POINT	79	–	22	3.59
CORDOVA	1753	126	657	2.67
CRAIG	516	11	176	2.93
DEERING	150	–	35	4.29
DELTA JUNCTION	945	–	348	2.72
DILLINGHAM	1563	–	467	3.35
DIOMEDE	139	–	30	4.63
EAGLE	110	–	48	2.29
EEK	228	–	55	4.07
EKWOK	77	–	20	3.85
ELIM	211	–	48	4.40
EMMONAK	564	3	127	4.44
FAIRBANKS	21164	1481	8145	2.60
FORTUNA LEDGE	262	–	64	4.09
FORT YUKON	586	33	187	3.13
GALENA	463	302	146	3.19
GAMBELL	445	–	103	4.32
GOLOVIN	87	–	31	2.81
GOODNEWS BAY	168	–	42	4.00
GRAYLING	209	–	52	4.02
HAINES	993	–	336	2.96
HOLY CROSS	241	–	63	3.83
HOMER	2160	49	812	2.66
HOONAH	675	5	189	3.99
HOOPER BAY	627	–	125	5.02
HOUSTON	370	–	129	2.87
HUGHES	73	–	22	3.32
HUSLIA	188	–	59	3.19
HYDABURG	298	–	97	3.07
JUNEAU	19255	273	7035	2.74
KACHEMAK	403	–	129	3.12
KAKE	548	7	146	3.75
KAKTOVIK	165	–	38	4.34
KALTAG	247	–	58	4.26
KASAAN	25	–	9	2.78
KENAI	4318	8	1506	2.87
KETCHIKAN	7020	178	2644	2.66
KIANA	345	–	75	4.60
KING COVE	459	1	114	4.03
KIVALINA	241	–	37	6.51
KLAWOCK	318	–	79	4.03
KOBUK	62	–	16	3.88
KODIAK	4564	192	1535	2.97
KOTLIK	293	–	59	4.97
KOTZEBUE	2046	8	565	3.62
KOYUK	188	–	48	3.92
KOYUKUK	98	–	26	3.77

Table II.24
Number of Persons in Households and Group Quarters, Total Households and Average Number of Persons Per Household, By Municipality, 1980
State of Alaska
(Continued)

	PERSONS IN HOUSEHOLDS	PERSONS IN GROUP QUARTERS	TOTAL HOUSE-HOLDS	PERSONS PER HOUSE-HOLD
KUPREANOF	47	–	21	2.24
KWETHLUK	454	–	88	5.16
LARSEN BAY	144	24	41	3.51
LOWER KALSKAG	246	–	55	4.47
MC GRATH	356	–	129	2.75
MANOKOTAK	294	–	57	5.16
MEKORYUK	160	–	44	3.64
MTN. VILLAGE	583	–	107	5.45
NAPAKIAK	262	–	60	4.37
NAPASKIAK	244	–	49	4.98
NENANA	470	–	163	2.88
NEWHALEN	87	–	18	4.83
NEW STUYAHOK	331	–	65	5.09
NEWTOK	131	–	28	4.68
NIGHTMUTE	119	–	24	4.96
NIKOLAI	91	–	22	4.14
NOME	2258	43	697	3.24
NONDALTON	173	–	42	4.12
NOORVIK	492	–	91	5.41
NORTH POLE	724	–	249	2.91
NUIQSUT	208	–	50	4.16
NULATO	350	–	71	4.93
OLD HARBOR	340	–	88	3.86
OUZINKIE	173	–	57	3.04
PALMER	2043	98	725	2.82
PELICAN	172	8	64	2.69
PETERSBURG	2783	38	979	2.84
PILOT STATION	320	5	61	5.25
PLATINUM	55	–	14	3.93
POINT HOPE	464	–	98	4.73
PORT ALEXAMDER	86	–	37	2.32
PORT HEIDEN	92	–	29	3.17
PORT LIONS	215	–	66	3.26
QUINHAGAK	412	–	82	5.02
RUBY	197	–	63	3.13
RUSSIAN MISSION	169	–	41	4.12
ST. MARY'S	354	28	72	4.92
ST. MICHAEL	239	–	57	4.19
ST. PAUL	527	24	126	4.18
SAND POINT	577	48	186	3.10
SAVOONGA	491	–	109	4.50
SAXMAN	258	15	66	3.91
SCANNON BAY	250	–	47	5.32
SELAWIK	361	–	69	5.23
SELDOVIA	479	–	175	2.74
SEWARD	1677	166	670	2.50
SHAGELUK	131	–	35	3.74
SHAKTOOLIK	164	–	43	3.81
SHELDON POINT	103	–	20	5.15
SHISHMAREF	394	–	86	4.58
SHUNGNAK	202	–	47	4.30
SITKA	7436	367	2440	3.05
SKAGWAY	768	–	289	2.66
SOLDOTNA	2320	–	808	2.87
STEBBINS	331	–	69	4.80
TANANA	376	12	118	3.19
TELLER	212	–	65	3.26
TENAKEE SPRINGS	138	–	70	1.97
TOGIAK	470	–	101	4.65
TOKSOOK BAY	333	–	65	5.12
TULUKSAK	236	–	42	5.62
TUNUNAK	295	–	68	4.38
UNALAKEET	623	–	158	3.94
UNALASKA	722	600	304	2.38
UPPER KALSKAG	129	–	34	3.79
VALDEZ	2755	304	957	2.88
WAINWRIGHT	405	–	93	4.35
WALES	133	–	37	3.59
WASILLA	1559	–	507	3.07
WHITE MOUNTAIN	125	–	36	3.47
WHITTIER	185	13	77	2.40
WRANGELL	2134	50	758	2.82
YAKUTAT	449	–	139	3.23

III. ILLUSTRATIVE POPULATION PROJECTIONS: 1981 TO 1985

Introduction

This section presents illustrative projections to 1985 of the resident population of Alaska, classified by age, race, and sex. Three series of projections show the effects of applying three different assumptions (scenarios) concerning migration to the 1980 population as classified by age, race, and sex. The series have common assumptions concerning projected fertility and mortality. They also assume that military strength will remain at current levels. The major differences found in comparing data from each series are due to the effects of migration. For each series the migration assumptions are:

Series	Assumption
A	The number of people moving into the state exceeds the number leaving; similar to the migration pattern experienced between 1970 and 1973.
B	The number of people leaving the state exceeds the number moving into the state; similar to and continuing the migration pattern experienced between 1979 and 1981.
C	The number of people moving into the state equals the number leaving; zero net numbers of migrants, 1980 to 1985

The projections are best viewed as showing what would happen if the specific migration patterns assumed for each series were to occur between 1980 and 1985. By reviewing both the assumptions and results for each series, someone can select the set of projections that most closely resembles one's own assumptions. Some help in selecting a series can be provided by briefly describing the scenarios underlying the three sets of migration patterns. The most likely scenario, that represented by series A, shows steady but not explosive in-migration. It portrays Alaska as offering employment opportunities attractive to outsiders without the occurrence of a "pipeline boom." On the other hand, the least likely scenario is represented by series C, which shows zero net migration. Although this is very unlikely, the series serves a useful purpose by illustrating what would be likely to occur to the state's population from the effects of fertility and mortality alone. This series provides a basis from which to measure the effects of any other projection that does include migration. Series B, which shows continued but low levels of out-migration, could represent a scenario in which employment opportunities do not keep pace with the potential Alaskan labor force so that people are forced to go outside for work.

In general, the three series should accommodate a wide range of applications and needs. Still, someone may decide that none of the scenarios represents one's own ideas of the future. However, even in this case the projections given here—especially series C—should be useful by providing a starting point from which alternatives can be generated.

The projections are given for April 1st of each year from 1981 to 1985 because the 1970 and 1980 census results, which form, respectively, a basis and calibration point for the projections, are for an April 1st date. Because of the necessity to use an April 1st date and the assumptions used, the total population given for 1981 in each series is different than the total population estimated for July 1st, 1981.

Comparative Results

Under these three sets of assumptions, comparisons of the expected demographic characteristics of Alaska by 1985 are informative. For example, the assumption of zero net migration (Series "C" found in Table III.1) projects a total population of nearly 442,000 by 1985, which represents an increase of approximately 40,000 people over the total population counted in the 1980 census. The scenario for positive net migration (Series A, found in Table III.2) projects, as expected, an even larger total population by 1985: nearly 465,000 people. Finally, even if the state experiences the scenario given in Series B, (found in Table III.3) and more people leave the state than move into the state, the total population by 1985 still shows an increase over 1980: 32,000 more people are expected to be residing in Alaska. Significantly, these comparisons show that "natural increase," the excess of births over deaths, is sufficient to guarantee an increase in population by 1985 even under the assumption of negative net migration given in Series B. Under all three scenarios, it is, in fact, natural increase and not migration that is the major force acting on the state's population.

In terms of other characteristics of the population, the three scenarios show very little divergence by 1985. For example, under Series A, B, and C, the percent of the population aged 65 and over is 3.10, 3.16, and 3.09, respectively. Similar equivalencies are found for the percent non-white, percent male, and percent aged 20-34.

Methodology

The Alaska population projections are based upon the cohort-component method, which is a standard demographic approach to forecasting. The logic of the cohort-component methodology calls for Alaska's population to be disaggregated by age-sex-race groups and then projected by these groups. This disaggregation is necessary because populations have a variable age-sex-race structure and rates of components of demographic change such as mortality and migration vary by age, sex, and race. For each series, A, B, and C, the components of change are found, along with the preceding and resulting population by year 1980 to 1985, in Tables III.4, III.5, and III.6, respectively.

Because of a need to develop migration data for analytical purposes, the three sets of projections are actually taken from the 1970 census results for Alaska and "passed through" the 1980 census population classified by age, race and sex. This calibration resulted in a 1980 base population that varies slightly from the reported 1980 census data. A comparison of the differences is shown in Table III.7 and the model's results for 1980 are found in Table III.8.

Special procedures were used in the projections to deal with Alaska's military-related population so that members of the armed forces would not be projected into the future in the same manner as the civilian population. Another special procedure allows for dealing with college-related migration in a manner similar to the military.

An "inflation-deflation" procedure often found in demographic forecasts was not used for the projections given here. This procedure, which assumes an undercount in the census population forming the basis of a forecast scenario, usually applies correction factors to "inflate" the base population and additional factors to "deflate" the projected population. While this procedure can correct for assumed distortions in a base population's age, sex, and race structure, it inhibits an evaluation of the components of change. It was because of the desire to develop an analysis of Alaska's components of change, and an assumption that errors did not create significant structural distortions in the 1970 and 1980 census results, that the "inflation-deflation" procedure was not used.

Table III.1
Series A
Projected Population By Age, Race, and Sex
1981

AGE	---TOTAL--- TOTAL	MALE	FEMALE	---WHITE--- TOTAL	MALE	FEMALE	--NONWHITE-- TOTAL	MALE	FEMALE	AGE
TOTAL	407661	216318	191343	313132	167637	145495	94529	48681	45848	TOTAL
0- 4	41475	21201	20274	30293	15489	14804	11182	5712	5470	0- 4
5- 9	33333	17027	16306	23592	12054	11538	9741	4973	4768	5- 9
10-14	34650	17829	16821	25295	13058	12237	9355	4771	4584	10-14
15-19	36473	19519	16954	25692	13879	11813	10781	5640	5141	15-19
20-24	45979	25417	20562	34638	19337	15301	11341	6080	5261	20-24
25-29	48852	25161	23691	38970	20021	18945	9882	5140	4742	25-29
30-34	42942	22102	19840	35410	19265	16145	7532	3837	3695	30-34
35-39	32010	17721	14289	26547	14943	11604	5463	2778	2685	35-39
40-44	23293	12679	10614	18852	10404	8448	4441	2275	2166	40-44
45-49	18727	10133	8594	14998	8229	6769	3729	1904	1825	45-49
50-54	15877	8828	7049	12730	7247	5483	3147	1581	1566	50-54
55-59	12851	6836	6015	10412	5593	4819	2439	1243	1196	55-59
60-64	8941	4694	4247	7105	3787	3318	1836	907	929	60-64
65-69	5587	2918	2669	4123	2184	1939	1464	734	730	65-69
70-74	3311	1704	1607	2269	1163	1106	1042	541	501	70-74
75-79	1899	909	990	1235	576	659	664	333	331	75-79
80-84	832	389	443	546	249	297	286	140	146	80-84
85+	629	251	378	425	159	266	204	92	112	85+

1982

AGE	---TOTAL--- TOTAL	MALE	FEMALE	---WHITE--- TOTAL	MALE	FEMALE	--NONWHITE-- TOTAL	MALE	FEMALE	AGE
TOTAL	417211	221281	195930	320647	171611	149036	96564	49670	46894	TOTAL
0- 4	43666	22322	21344	32056	16391	15665	11610	5931	5679	0- 4
5- 9	33520	17123	16397	23680	12099	11581	9840	5024	4816	5- 9
10-14	35063	17987	17076	25883	13310	12573	9180	4677	4503	10-14
15-19	36816	19716	17100	26002	14038	11964	10814	5678	5136	15-19
20-24	46777	24464	20313	35260	20288	14972	11517	6176	5341	20-24
25-29	48119	24096	24023	37967	18845	19122	10152	5251	4901	25-29
30-34	43461	23882	19579	35626	19858	15768	7835	4024	3811	30-34
35-39	34939	19041	15948	29200	16125	13075	5789	2916	2873	35-39
40-44	24377	13088	11289	19770	10738	9032	4607	2350	2257	40-44
45-49	17212	10418	6794	15328	8445	6883	3884	1973	1911	45-49
50-54	15882	8803	7079	12772	7244	5528	3110	1559	1551	50-54
55-59	13162	7008	6154	10551	5681	4870	2611	1327	1284	55-59
60-64	9466	4944	4522	7579	3598	3581	1887	946	941	60-64
65-69	5757	3025	2732	4285	2309	1976	1472	716	756	65-69
70-74	3486	1767	1719	2375	1206	1165	1111	561	550	70-74
75-79	1955	941	1011	1301	611	690	651	330	321	75-79
80-84	885	415	470	583	267	316	302	148	154	80-84
85+	621	241	380	429	158	271	192	83	109	85+

1983

AGE	---TOTAL--- TOTAL	MALE	FEMALE	---WHITE--- TOTAL	MALE	FEMALE	--NONWHITE-- TOTAL	MALE	FEMALE	AGE
TOTAL	431461	228823	202638	332822	178146	154676	98639	50677	47962	TOTAL
0- 4	45979	23505	22474	33999	17384	16615	11980	6121	5859	0- 4
5- 9	34863	17810	17053	24823	12684	12139	10040	5126	4914	5- 9
10-14	35860	18402	17458	26647	13729	12918	9213	4673	4540	10-14
15-19	36357	19402	16955	25914	13880	12034	10443	5522	4921	15-19
20-24	49691	28085	20606	36934	21795	15139	11757	6290	5467	20-24
25-29	46670	22642	24028	36419	17344	19075	10251	5298	4953	25-29
30-34	46093	25474	20619	37755	21176	16579	8338	4298	4040	30-34
35-39	37879	20594	17285	31605	17448	14157	6274	3146	3128	35-39
40-44	26326	14204	12122	21672	11807	9865	4654	2397	2257	40-44
45-49	19818	10756	9062	15855	8755	7100	3963	2001	1962	45-49
50-54	16186	8911	7275	12893	7271	5622	3293	1640	1653	50-54
55-59	13591	7241	6350	10951	5913	5038	2640	1328	1312	55-59
60-64	9919	5184	4735	7911	4160	3751	2008	1024	984	60-64
65-69	6014	3144	2870	4547	2469	2078	1467	675	792	65-69
70-74	3607	1817	1790	2458	1238	1220	1149	579	570	70-74
75-79	2032	985	1047	1365	651	714	667	334	333	75-79
80-84	966	432	534	640	281	359	326	151	175	80-84
85+	610	235	375	434	161	273	176	74	102	85+

1984

AGE	---TOTAL--- TOTAL	MALE	FEMALE	---WHITE--- TOTAL	MALE	FEMALE	--NONWHITE-- TOTAL	MALE	FEMALE	AGE
TOTAL	446931	237039	209892	346147	185330	160817	100784	51709	49075	TOTAL
0- 4	48203	24641	23556	36076	18447	17629	12124	6194	5930	0- 4
5- 9	36933	18900	18030	26533	13560	12973	10457	5340	5117	5- 9
10-14	35956	18372	17584	26520	13585	12935	9436	4787	4649	10-14
15-19	36447	18943	17504	26441	14141	12300	10006	5262	4744	15-19
20-24	40440	19776	20664	38553	23346	15207	11887	6433	5457	20-24
25-29	45185	21257	23578	34770	15910	18860	10415	5297	5118	25-29
30-34	45162	22946	22216	40403	22420	17983	8759	4526	4233	30-34
35-39	41041	22581	18460	34290	19170	15120	6751	3421	3330	35-39
40-44	26493	15349	11141	23594	12944	10750	4896	2505	2391	40-44
45-49	20372	11098	9274	16454	9138	7346	3919	1990	1929	45-49
50-54	16570	9064	7506	13122	7363	5759	3448	1701	1747	50-54
55-59	13912	7394	6518	11232	6049	5183	2680	1345	1335	55-59
60-64	10454	5529	4965	8320	4419	3901	2174	1110	1064	60-64
65-69	6200	3202	2998	4714	2523	2191	1486	679	807	65-69
70-74	3729	1873	1856	2559	1301	1258	1170	572	598	70-74
75-79	2107	1011	1096	1433	685	748	674	326	348	75-79
80-84	1032	492	540	704	298	406	328	154	174	80-84
85+	804	231	573	429	161	268	175	70	105	85+

1985

AGE	---TOTAL--- TOTAL	MALE	FEMALE	---WHITE--- TOTAL	MALE	FEMALE	--NONWHITE-- TOTAL	MALE	FEMALE	AGE
TOTAL	464606	246466	218140	361497	193640	167857	103109	52826	50283	TOTAL
0- 4	50435	25782	24653	37995	19427	18568	12440	6355	6085	0- 4
5- 9	39841	20340	19501	29122	14886	14236	10759	5494	5265	5- 9
10-14	35241	17998	17243	25598	13074	12524	9643	4924	4719	10-14
15-19	37232	19785	17447	27523	14759	12764	9709	5076	4683	15-19
20-24	42051	21404	20647	40145	24895	15250	11906	6509	5397	20-24
25-29	44232	20201	24031	33903	15029	18874	10329	5172	5157	25-29
30-34	52699	28473	24226	43276	23566	19710	9423	4907	4516	30-34
35-39	44545	24662	19883	37255	20557	16298	7290	3705	3585	35-39
40-44	30395	16399	13996	25364	13856	11508	5031	2543	2488	40-44
45-49	21025	11628	9397	16998	9565	7433	4027	2043	1984	45-49
50-54	17148	9269	7879	13639	7512	6127	3509	1757	1752	50-54
55-59	14443	7709	6734	11600	6316	5284	2843	1393	1450	55-59
60-64	10878	5679	5199	8636	4542	4094	2242	1137	1105	60-64
65-69	6529	3353	3176	5000	2659	2341	1529	694	835	65-69
70-74	3939	1967	1972	2712	1378	1334	1227	589	638	70-74
75-79	2193	1058	1135	1509	726	783	684	332	352	75-79
80-84	1142	490	652	788	331	457	354	159	195	80-84
85+	568	229	339	434	162	272	164	67	97	85+

Table III.2
Series B
Projected Population By Age, Race, and Sex
1981

AGE	---TOTAL--- TOTAL	MALE	FEMALE	---WHITE--- TOTAL	MALE	FEMALE	--NONWHITE-- TOTAL	MALE	FEMALE	AGE
TOTAL	407661	216318	191343	313132	167637	145495	94529	48681	45848	TOTAL
0- 4	41475	21201	20274	30293	15489	14804	11182	5712	5470	0- 4
5- 9	33323	17027	16296	23592	12054	11538	9741	4973	4768	5- 9
10-14	34650	17829	16821	25295	13058	12237	9355	4771	4584	10-14
15-19	36473	19519	16954	25692	13879	11813	10781	5640	5141	15-19
20-24	45979	25417	20562	34638	19337	15301	11341	6080	5261	20-24
25-29	48852	25161	23691	38970	20021	18949	9882	5140	4742	25-29
30-34	42942	23102	19840	35410	19265	16145	7532	3837	3695	30-34
35-39	31010	17721	14289	26547	14943	11604	5463	2778	2685	35-39
40-44	23293	12679	10614	18852	10404	8448	4441	2275	2166	40-44
45-49	18727	10133	8594	14998	8229	6769	3729	1904	1825	45-49
50-54	15877	8828	7049	12730	7247	5483	3147	1581	1566	50-54
55-59	12951	6836	6015	10412	5591	4815	2439	1243	1196	55-59
60-64	8941	4694	4247	7105	3787	3318	1836	907	929	60-64
65-69	5587	2918	2669	4123	2184	1939	1464	734	730	65-69
70-74	3311	1704	1607	2269	1163	1106	1042	541	501	70-74
75-79	1899	909	990	1235	576	659	664	333	331	75-79
80-84	832	389	443	546	249	297	286	140	145	80-84
85+	629	251	378	425	159	266	204	92	112	85+

1982

AGE	---TOTAL--- TOTAL	MALE	FEMALE	---WHITE--- TOTAL	MALE	FEMALE	--NONWHITE-- TOTAL	MALE	FEMALE	AGE
TOTAL	414291	219814	194477	317877	170230	147647	96414	49584	46830	TOTAL
0- 4	43421	22157	21224	31815	16268	15547	11606	5929	5677	0- 4
5- 9	33277	16999	16278	23445	11979	11466	9832	5020	4812	5- 9
10-14	34819	17861	16958	25639	13184	12455	9180	4677	4503	10-14
15-19	36611	19607	17004	25797	13929	11868	10814	5678	5136	15-19
20-24	46612	26431	20181	35125	20281	14844	11487	6150	5337	20-24
25-29	47646	23898	23748	37572	18661	18911	10124	5237	4887	25-29
30-34	43056	23666	19390	34251	19657	15594	7805	4009	3796	30-34
35-39	34682	18871	15811	28909	15963	12946	5773	2908	2865	35-39
40-44	24134	12979	11205	19587	10434	8953	4597	2345	2252	40-44
45-49	19074	10342	8732	15200	8374	6826	3874	1968	1906	45-49
50-54	15774	8742	7032	12674	7188	5486	3100	1554	1546	50-54
55-59	13036	6568	6118	10479	5643	4836	2607	1325	1282	55-59
60-64	9402	4515	4887	7515	3969	3546	1887	946	941	60-64
65-69	5708	3001	2707	4236	2285	1951	1472	716	756	65-69
70-74	3456	1753	1703	2345	1192	1153	1111	561	550	70-74
75-79	1932	941	1001	1281	601	680	651	330	321	75-79
80-84	842	414	428	580	266	314	302	149	154	80-84
85+	619	259	380	427	156	271	192	83	109	85+

1983

AGE	---TOTAL--- TOTAL	MALE	FEMALE	---WHITE--- TOTAL	MALE	FEMALE	--NONWHITE-- TOTAL	MALE	FEMALE	AGE
TOTAL	420741	223219	197522	322502	172767	149735	98239	50452	47787	TOTAL
0- 4	45180	23097	22083	33208	16980	16228	11972	6117	5855	0- 4
5- 9	34024	17382	16642	24006	12267	11739	10018	5115	4903	5- 9
10-14	35025	17972	17053	25812	13299	12512	9273	4673	4540	10-14
15-19	35608	19011	16597	25165	13489	11676	10443	5522	4921	15-19
20-24	47437	27373	20064	35726	21120	14606	11711	6253	5458	20-24
25-29	45278	22051	23227	35115	16808	18307	10163	5243	4920	25-29
30-34	44578	24644	19934	36314	20383	15931	8264	4261	4003	30-34
35-39	36704	19944	16760	30474	16820	13654	6230	3124	3106	35-39
40-44	25615	13800	11815	20991	11418	9573	4624	2382	2242	40-44
45-49	19370	10506	8864	15437	8520	6917	3933	1986	1947	45-49
50-54	15857	8726	7131	12594	7101	5493	3263	1625	1638	50-54
55-59	13353	7117	6236	10713	5799	4534	2620	1318	1302	55-59
60-64	9741	5104	4637	7741	4084	3657	2000	1020	980	60-64
65-69	5895	3088	2807	4428	2413	2015	1467	675	792	65-69
70-74	3533	1782	1751	2384	1203	1181	1149	579	570	70-74
75-79	1986	965	1021	1319	631	688	667	334	333	75-79
80-84	950	425	525	624	274	350	326	151	175	80-84
85+	607	232	375	431	158	273	176	74	102	85+

1984

AGE	---TOTAL--- TOTAL	MALE	FEMALE	---WHITE--- TOTAL	MALE	FEMALE	--NONWHITE-- TOTAL	MALE	FEMALE	AGE
TOTAL	427213	220637	206576	327127	175308	151819	100086	51329	48755	TOTAL
0- 4	46877	23964	22913	34768	17778	16990	12109	6186	5923	0- 4
5- 9	35423	18099	17324	25004	12718	12286	10419	5321	5098	5- 9
10-14	34439	17620	16819	25055	12834	12221	9434	4786	4648	10-14
15-19	35094	18701	16393	25096	13443	11653	9998	5258	4740	15-19
20-24	48076	28382	19694	36225	21576	14649	11851	6806	5045	20-24
25-29	42714	20146	22568	32459	14954	17505	10255	5192	5063	25-29
30-34	46264	25367	20897	37629	20903	16726	8635	4464	4171	30-34
35-39	38753	21310	17443	32086	17931	14155	6667	3379	3288	35-39
40-44	27388	14555	12833	22252	12080	10172	4836	2475	2361	40-44
45-49	17562	10641	8921	15692	8674	7018	3870	1967	1903	45-49
50-54	15990	8737	7253	12591	7060	5531	3399	1677	1722	50-54
55-59	13482	7169	6313	10840	5843	4997	2642	1326	1316	55-59
60-64	12183	5385	4798	8029	4285	3744	2154	1100	1054	60-64
65-69	5234	3103	2881	4508	2429	2079	1476	674	802	65-69
70-74	3597	1811	1786	2433	1242	1191	1164	569	595	70-74
75-79	2529	979	1550	1357	654	703	672	325	347	75-79
80-84	1003	439	564	675	285	390	328	154	174	80-84
85+	603	229	374	428	159	269	175	70	105	85+

1985

AGE	---TOTAL--- TOTAL	MALE	FEMALE	---WHITE--- TOTAL	MALE	FEMALE	--NONWHITE-- TOTAL	MALE	FEMALE	AGE
TOTAL	433686	230070	203616	331777	177875	153902	101909	52195	49714	TOTAL
0- 4	48583	24834	23747	36165	18491	17674	12415	6342	6073	0- 4
5- 9	37311	19067	18244	26624	13609	13015	10687	5458	5229	5- 9
10-14	33101	16905	16196	23670	11987	11683	9431	4918	4713	10-14
15-19	35137	18061	16426	25424	13668	11756	9683	5013	4670	15-19
20-24	48139	29185	19202	36525	22698	13827	11862	6487	5375	20-24
25-29	40467	18566	21901	30380	13546	16834	10087	5020	5067	25-29
30-34	47987	25542	22045	38768	21137	17631	9219	4805	4414	30-34
35-39	40787	22551	18236	33645	18920	14725	7142	3631	3511	35-39
40-44	28078	15086	12992	23149	12594	10555	4929	2492	2437	40-44
45-49	19760	10099	9861	15815	8877	6938	3945	2022	1923	45-49
50-54	16247	8770	7477	12816	7051	5765	3431	1719	1712	50-54
55-59	13772	7350	6422	10995	5990	5005	2777	1360	1417	55-59
60-64	10409	5458	4951	8207	4341	3866	2202	1117	1085	60-64
65-69	6156	3201	2955	4699	2523	2176	1497	678	819	65-69
70-74	3727	1969	1758	2525	1293	1232	1202	676	526	70-74
75-79	2079	1009	1070	1395	677	718	684	332	352	75-79
80-84	1045	472	573	743	314	429	352	158	194	80-84
85+	596	226	370	432	159	273	164	67	97	85+

Table III.3
Series C
Projected Population By Age, Race, and Sex
1981

AGE	---TOTAL--- TOTAL	MALE	FEMALE	---WHITE--- TOTAL	MALE	FEMALE	--NONWHITE-- TOTAL	MALE	FEMALE	AGE
TOTAL	408311	216813	191498	313382	168051	145831	94429	48762	45667	TOTAL
0- 4	41494	21170	20324	30347	15517	14830	11107	5653	5454	0- 4
5- 9	33303	17015	16288	23645	12091	11554	9655	4829	4726	5- 9
10-14	34614	17811	16803	25351	13087	12264	9263	4724	4539	10-14
15-19	36548	18557	17991	25746	13907	11839	10802	5650	5152	15-19
20-24	46506	25746	20760	34763	19414	15345	11743	6332	5411	20-24
25-29	49157	25371	23786	39101	20092	19009	10056	5279	4777	25-29
30-34	43038	23182	19856	35510	19322	16188	7528	3860	3668	30-34
35-39	32077	17762	14317	26620	14985	11635	5459	2777	2682	35-39
40-44	23283	12677	10606	18893	10427	8466	4390	2250	2140	40-44
45-49	18692	10120	8572	15023	8244	6779	3669	1876	1794	45-49
50-54	15832	8801	7031	12746	7255	5491	3086	1546	1540	50-54
55-59	12817	6817	6000	10422	5598	4824	2395	1219	1176	55-59
60-64	8885	4672	4213	7111	3789	3322	1774	883	891	60-64
65-69	5511	2882	2629	4126	2186	1940	1385	696	689	65-69
70-74	3263	1680	1583	2272	1163	1109	991	517	474	70-74
75-79	1878	900	978	1235	576	659	643	324	319	75-79
80-84	829	386	443	546	249	297	283	137	146	80-84
85+	625	249	376	425	159	266	200	90	110	85+

1982

AGE	---TOTAL--- TOTAL	MALE	FEMALE	---WHITE--- TOTAL	MALE	FEMALE	--NONWHITE-- TOTAL	MALE	FEMALE	AGE
TOTAL	416361	221104	195257	319997	171273	148724	96364	49831	46533	TOTAL
0- 4	43464	22218	21246	31992	16358	15634	11472	5860	5612	0- 4
5- 9	33291	17005	16286	23629	12073	11556	9662	4932	4730	5- 9
10-14	34842	17873	16969	25838	13296	12542	9004	4577	4427	10-14
15-19	36753	19680	17070	25945	14508	11437	10805	5672	5133	15-19
20-24	47418	26868	20550	35165	20239	14926	12253	6629	5624	20-24
25-29	48482	24403	24079	37874	18807	19067	10608	5596	5012	25-29
30-34	43368	23889	19479	35530	19807	15723	7838	4082	3756	30-34
35-39	34905	19000	15905	29132	16087	13045	5773	2913	2860	35-39
40-44	24251	13019	11232	19737	10717	9020	4514	2302	2212	40-44
45-49	17064	10348	8716	15308	8434	6874	3756	1914	1842	45-49
50-54	15747	8727	7020	12755	7234	5521	2992	1493	1499	50-54
55-59	13059	6950	6109	10542	5676	4866	2517	1274	1243	55-59
60-64	9346	4894	4452	7575	3996	3579	1771	898	873	60-64
65-69	5569	2952	2647	4282	2309	1973	1317	643	674	65-69
70-74	3372	1710	1662	2379	1206	1173	993	504	489	70-74
75-79	1912	923	989	1301	611	690	611	312	299	75-79
80-84	875	408	468	583	267	316	293	141	152	80-84
85+	615	237	378	430	158	272	185	79	106	85+

1983

AGE	---TOTAL--- TOTAL	MALE	FEMALE	---WHITE--- TOTAL	MALE	FEMALE	--NONWHITE-- TOTAL	MALE	FEMALE	AGE
TOTAL	424611	225504	199107	326322	174610	151712	98289	50894	47395	TOTAL
0- 4	45253	23153	22139	33507	17132	16375	11785	6021	5764	0- 4
5- 9	34117	17429	16688	24356	12446	11910	9761	4983	4778	5- 9
10-14	35134	18030	17104	26181	13488	12693	8953	4542	4411	10-14
15-19	35813	19117	16696	25433	13628	11805	10380	5489	4891	15-19
20-24	48617	28024	20593	35879	21139	14740	12738	6885	5853	20-24
25-29	46180	22742	23738	35430	16872	18558	10750	5870	5180	25-29
30-34	45202	25071	20131	36831	20654	16177	8371	4417	3954	30-34
35-39	37131	20191	16940	30890	17049	13841	6241	3142	3099	35-39
40-44	25319	13915	11904	21290	11585	9705	4029	2330	2199	40-44
45-49	19410	10547	8863	15647	8437	7210	3763	2110	1653	45-49
50-54	15866	8732	7134	12754	7193	5561	3112	1539	1573	50-54
55-59	13342	7103	6239	10859	5865	4994	2483	1238	1245	55-59
60-64	9696	5085	4611	7858	4137	3721	1838	948	890	60-64
65-69	5766	3037	2729	4520	2458	2062	1246	579	667	65-69
70-74	3421	1724	1697	2453	1234	1219	968	490	478	70-74
75-79	1959	956	1003	1361	651	710	598	305	293	75-79
80-84	944	418	526	639	281	358	305	137	168	80-84
85+	602	230	372	434	161	273	168	69	99	85+

1984

AGE	---TOTAL--- TOTAL	MALE	FEMALE	---WHITE--- TOTAL	MALE	FEMALE	--NONWHITE-- TOTAL	MALE	FEMALE	AGE
TOTAL	423081	229883	203201	332847	178051	154796	100234	51829	49405	TOTAL
0- 4	47154	24134	23049	35173	17984	17189	11980	6150	5830	0- 4
5- 9	35707	18244	17463	25546	13057	12489	10158	5187	4971	5- 9
10-14	34772	17763	17009	25562	13106	12456	9210	4657	4521	10-14
15-19	33362	18842	14520	25507	13657	11850	9855	5185	4670	15-19
20-24	40115	20535	20180	26512	12567	14445	12603	6868	5735	20-24
25-29	44183	20662	23388	32726	14926	17840	11384	5936	5448	25-29
30-34	47269	26008	21261	38427	21310	17117	9839	4694	5144	30-34
35-39	34445	21758	17727	32746	18296	14450	6689	3412	3277	35-39
40-44	27512	14772	12730	22729	12349	10380	4783	2443	2340	40-44
45-49	19727	10753	8973	16018	8856	7162	3711	1894	1817	45-49
50-54	16093	8801	7292	12835	7198	5637	3258	1603	1655	50-54
55-59	13539	7190	6349	11039	5952	5086	2500	1240	1260	55-59
60-64	13251	5393	4858	8206	4365	3841	1995	1028	967	60-64
65-69	5418	3085	2833	4655	2498	2157	1263	587	676	65-69
70-74	3515	1769	1747	2543	1293	1250	973	476	497	70-74
75-79	2014	975	1039	1421	681	740	593	294	299	75-79
80-84	1012	443	572	755	298	454	310	142	168	80-84
85+	590	223	367	427	160	267	163	63	100	85+

1985

AGE	---TOTAL--- TOTAL	MALE	FEMALE	---WHITE--- TOTAL	MALE	FEMALE	--NONWHITE-- TOTAL	MALE	FEMALE	AGE
TOTAL	441756	234305	207371	339497	181580	157917	102259	52805	49454	TOTAL
0- 4	48392	25043	23349	36544	18735	17809	12349	6308	6040	0- 4
5- 9	37438	19332	18106	27405	14008	13397	10431	5327	5104	5- 9
10-14	35510	17123	16407	24155	12335	11820	9375	4788	4587	10-14
15-19	35501	18889	16612	26003	13969	12034	9498	4920	4578	15-19
20-24	49313	27662	19651	36360	22876	14684	12353	6786	5567	20-24
25-29	42023	19243	22788	30657	13417	17240	11376	5828	5548	25-29
30-34	49442	26819	22623	39869	21680	19189	9573	5139	4434	30-34
35-39	41775	23135	18641	34582	19441	15141	7194	3694	3500	35-39
40-44	28793	15402	13388	23821	12973	10848	4929	2489	2440	40-44
45-49	20220	11290	8930	16262	9129	7133	3798	1951	1847	45-49
50-54	14453	8893	7560	13152	7239	5913	3301	1654	1647	50-54
55-59	13309	7419	6490	11270	6141	5129	2639	1278	1361	55-59
60-64	10514	5510	5004	8446	4454	3992	2069	1056	1012	60-64
65-69	6201	3223	2978	4900	2615	2285	1301	608	693	65-69
70-74	3683	1846	1837	2676	1363	1313	1007	483	524	70-74
75-79	2081	1010	1071	1486	716	770	595	294	301	75-79
80-84	1104	475	629	780	330	450	324	145	179	80-84
85+	578	216	362	429	159	270	149	57	92	85+

Table III.4
Series A
Components of Change For The Total Population
1980-1981

AGE	1980 BASE PUPULATION MALE	FEMALE	TOTAL	DEATHS MALE	FEMALE	TOTAL	MIGRATION MALE	FEMALE	TOTAL	1981 ESTIMATED POPULATION MALE	FEMALE	TOTAL
0- 1	4406	4211	8617	74	56	130	-22	-21	-43	4800	4587	9387
1- 4	15447	14775	30222	14	11	25	-74	-70	-144	16431	15547	32098
5- 9	17613	16866	34479	15	10	24	-86	-82	-168	17027	16306	33333
10-14	17749	16668	34417	13	10	23	-88	-81	-169	17829	16421	34550
15-19	19336	16759	36095	31	15	46	-194	-133	-327	19519	16954	36473
20-24	24639	20750	45389	49	15	64	306	285	591	25417	20562	45979
25-29	25634	23437	49071	41	15	56	502	96	598	25161	23691	48852
30-34	22413	18711	41124	41	17	58	155	-18	137	23102	19840	42943
35-39	17084	14393	31477	41	19	60	49	47	96	17721	14289	32010
40-44	12440	10144	22584	47	24	71	-93	-83	-176	12679	10614	23293
45-45	9975	8407	18382	64	31	95	-90	-78	-168	10133	8524	18727
50-54	8789	7060	15849	87	38	125	-126	-59	-185	8828	7049	15877
55-59	6680	5863	12543	99	44	143	-91	-77	-168	6836	6015	12851
60-64	4444	3951	8395	100	45	145	-100	-122	-222	4694	4247	8941
65-69	2841	2567	5408	99	44	143	-97	-92	-189	2918	2669	5587
70-74	1611	1536	3147	83	46	129	-35	-45	-80	1704	1607	3311
75-79	885	943	1828	65	45	110	-12	-10	-22	909	990	1899
80-84	355	415	770	34	27	61	-6	-5	-11	389	443	832
85+	247	367	614	41	51	92	-3	-4	-7	251	378	629
TOTAL	212588	187823	400411	1037	563	1600	-105	-552	-657	216318	191343	407661

FERTILITY MEASURES: 1980 TO 1981

AGE	FEMALES	BIRTHS	RATE
15 - 19	16735	1180	0.0705
20 - 24	20285	3501	0.1726
25 - 29	23788	3095	0.1301
30 - 34	19358	1215	0.0628
35 - 39	14358	401	0.0280
40 - 44	10482	108	0.0102
TOTAL	105006	9500	0.4742

DEPENDENCY RATIOS	1980	1981
CHILD DEPENDENCY RATIO	49.77	49.41
AGED DEPENDENCY RATIO	4.53	4.63
TOTAL DEPENDENCY RATIO	54.30	54.04
SEX RATIO	113.19	113.05
MALE LIFE EXPECTANCY	70.96	
FEMALE LIFE EXPECTANCY	78.40	
TOTAL FERTILITY	2.3709	
GENERAL FERTILITY	90.4710	

1981-1982

AGE	1981 BASE PUPULATION MALE	FEMALE	TOTAL	DEATHS MALE	FEMALE	TOTAL	MIGRATION MALE	FEMALE	TOTAL	1982 ESTIMATED POPULATION MALE	FEMALE	TOTAL
0- 1	4800	4587	9387	79	60	139	0	0	0	4925	4706	9631
1- 4	16431	15547	32098	14	11	25	2	2	4	17397	16633	34035
5- 9	17027	16306	33333	13	10	23	1	1	2	17123	16397	33520
10-14	17829	16421	34650	13	10	23	-9	-9	-18	17987	17074	35043
15-19	19519	16954	36473	31	15	46	-90	-43	-133	19716	17100	36816
20-24	25417	20562	45979	49	15	64	329	439	768	26464	20313	46777
25-29	25161	23691	48852	43	15	58	663	257	920	26096	24023	48119
30-34	23102	19840	42943	43	19	62	320	117	437	23802	19979	43781
35-39	17721	14289	32010	43	19	62	166	136	302	18041	14468	32509
40-44	12679	10614	23293	47	24	71	-31	-40	-71	13188	11289	24477
45-45	10133	8524	18727	66	32	98	-53	-50	-103	10418	8774	19212
50-54	8828	7049	15877	89	37	126	-102	-37	-139	8803	7079	15882
55-59	6836	6015	12851	101	43	144	-79	-63	-142	7008	6154	13162
60-64	4694	4247	8941	108	48	156	-99	-122	-221	4944	4272	9216
65-69	2918	2669	5587	101	45	146	-100	-92	-192	3025	2732	5757
70-74	1704	1607	3311	92	50	142	-38	-44	-79	1767	1719	3486
75-79	909	990	1899	74	53	127	-12	-10	-22	941	1011	1952
80-84	389	443	832	48	42	90	-6	-3	-9	415	470	885
85+	251	378	629	45	56	101	-4	-5	-9	241	380	621
TOTAL	216318	191343	407661	1096	604	1700	1061	434	1495	221281	195930	417211

FERTILITY MEASURES: 1981 TO 1982

AGE	FEMALES	BIRTHS	RATE
15 - 19	16906	1213	0.0718
20 - 24	20071	3553	0.1770
25 - 29	24075	3191	0.1326
30 - 34	19793	1266	0.0640
35 - 39	14332	436	0.0305
40 - 44	11052	115	0.0104
TOTAL	107034	9750	0.4832

DEPENDENCY RATIOS	1981	1982
CHILD DEPENDENCY RATIO	49.41	49.13
AGED DEPENDENCY RATIO	4.63	4.68
TOTAL DEPENDENCY RATIO	54.04	53.81
SEX RATIO	113.05	112.94
MALE LIFE EXPECTANCY	70.50	
FEMALE LIFE EXPECTANCY	77.98	
TOTAL FERTILITY	2.4161	
GENERAL FERTILITY	91.0429	

Table III.4
(Continued)
1982-1983

AGE	1982 BASE POPULATION MALE	FEMALE	TOTAL	DEATHS MALE	FEMALE	TOTAL	MIGRATION MALE	FEMALE	TOTAL	1983 ESTIMATED POPULATION MALE	FEMALE	TOTAL
0- 1	4925	4706	9631	81	60	141	46	45	91	5091	4828	9919
1- 4	17397	16638	34035	14	13	27	166	159	325	18444	17646	36100
5- 9	17123	16397	33520	12	10	22	156	150	306	17812	17053	34863
10-14	17597	17076	34673	13	10	23	146	139	285	18402	17454	35860
15-19	19716	17100	36816	31	15	46	123	135	258	19442	16955	36357
20-24	26464	20313	46777	51	15	66	1075	731	1806	28085	22606	48691
25-29	24096	24023	48119	37	18	55	977	592	1569	22662	24023	46670
30-34	23882	19579	43461	43	18	61	669	372	1041	25474	20613	46293
35-39	19041	15448	34489	45	22	67	431	353	784	20554	17285	37839
40-44	13088	11289	24377	48	27	75	91	50	141	14204	12122	26326
45-49	10418	8796	19213	66	33	99	19	5	24	10756	9062	19818
50-54	8803	7079	15882	86	39	125	-54	2	-52	8911	7275	16186
55-59	7208	6154	13362	108	47	155	-49	-28	-77	7241	6350	13591
60-64	4944	4322	9266	118	50	168	-89	-111	-200	5186	4735	9919
65-69	3025	2732	5757	110	45	155	-100	-87	-187	3166	2973	6714
70-74	1767	1719	3486	96	50	146	-34	-42	-76	1817	1792	3807
75-79	941	1011	1952	79	52	131	-13	-8	-21	965	1047	2012
80-84	415	470	885	48	39	87	-7	-3	-10	432	534	966
85+	241	380	621	44	57	101	-4	-5	-9	235	375	610
TOTAL	221281	195930	417211	1120	620	1750	3549	2449	5998	228823	202638	431461

FERTILITY MEASURES: 1982 TO 1983

AGE	FEMALES	BIRTHS	RATE
15 - 19	16913	1232	0.0729
20 - 24	20055	3571	0.1786
25 - 29	24246	3261	0.1345
30 - 34	21178	1311	0.0649
35 - 39	16627	480	0.0289
40 - 44	11802	125	0.0106
TOTAL	105803	10000	0.4905

DEPENDENCY RATIOS	1982	1983
CHILD DEPENDENCY RATIO	49:13	48:76
AGED DEPENDENCY RATIO	4:68	4:71
TOTAL DEPENDENCY RATIO	53:81	53:47
SEX RATIO	112.94	112.92
MALE LIFE EXPECTANCY	70:26	
FEMALE LIFE EXPECTANCY	77:49	
TOTAL FERTILITY	2:4523	
GENERAL FERTILITY	91.0224	

1983-1984

AGE	1983 BASE POPULATION MALE	FEMALE	TOTAL	DEATHS MALE	FEMALE	TOTAL	MIGRATION MALE	FEMALE	TOTAL	1984 ESTIMATED POPULATION MALE	FEMALE	TOTAL
0- 1	5091	4828	9879	86	63	149	56	53	109	5202	4971	10173
1- 4	18454	17646	36100	14	14	28	209	196	405	18649	17828	36477
5- 9	17810	17053	34863	13	11	24	153	185	338	17832	17084	34916
10-14	18403	17453	35856	13	10	23	180	168	348	18403	17044	35447
15-19	19402	16955	36357	31	15	46	159	171	330	19776	17064	36840
20-24	28085	22606	48691	51	17	68	1242	789	2031	29776	20664	50440
25-29	22662	24023	46685	37	17	54	958	651	1609	21707	23378	45185
30-34	25474	20613	46087	44	20	64	784	439	1223	24046	22216	47162
35-39	20594	17285	37879	43	19	62	520	421	941	22501	18650	41151
40-44	14204	12122	26326	56	21	77	130	51	203	15146	13141	28420
45-49	10756	9062	19818	66	34	100	31	13	44	11098	9274	20372
50-54	8911	7275	16186	73	39	112	-44	-6	-38	9064	7506	16570
55-59	7241	6350	13591	93	46	139	-47	-27	-74	7396	6518	13914
60-64	5186	4735	9919	120	51	171	-87	-116	-203	4529	4965	10494
65-69	3166	2973	6139	122	51	173	-101	-84	-185	3262	2964	6226
70-74	1817	1792	3609	88	50	138	-31	-43	-74	1873	1456	3329
75-79	965	1047	2012	81	54	135	-16	-7	-23	1011	1096	2107
80-84	432	534	966	58	49	107	-8	-5	-13	442	540	982
85+	235	375	610	44	57	101	-4	-5	-9	231	371	604
TOTAL	228823	202638	431461	1179	651	1830	4120	2880	7000	237039	209892	446931

FERTILITY MEASURES: 1983 TO 1984

AGE	FEMALES	BIRTHS	RATE
15 - 19	16382	1268	0.0779
20 - 24	20278	3673	0.1812
25 - 29	24222	3304	0.1364
30 - 34	21432	1415	0.0658
35 - 39	17878	525	0.0293
40 - 44	12726	137	0.0107
TOTAL	113481	10630	0.4973

DEPENDENCY RATIOS	1983	1984
CHILD DEPENDENCY RATIO	48:76	48:46
AGED DEPENDENCY RATIO	4:71	4:68
TOTAL DEPENDENCY RATIO	53:47	53:14
SEX RATIO	112.92	112.93
MALE LIFE EXPECTANCY	70:31	
FEMALE LIFE EXPECTANCY	77:74	
TOTAL FERTILITY	2:4863	
GENERAL FERTILITY	98.7646	

Table III.4
(Continued)
1984-1985

AGE	1984 BASE POPULATION MALE	FEMALE	TOTAL	DEATHS MALE	FEMALE	TOTAL	MIGRATION MALE	FEMALE	TOTAL	1985 ESTIMATED POPULATION MALE	FEMALE	TOTAL
0- 1	5202	4971	10173	88	64	152	75	72	147	5329	5092	10420
1- 4	19439	18548	37987	18	14	32	97	75	172	20454	19556	40010
5- 9	18909	18070	36980	13	11	24	282	265	547	20380	19480	39860
10-14	18372	17584	35956	13	11	24	241	230	471	17998	17226	35224
15-19	17403	17044	34447	13	11	24	234	243	477	19785	17449	37235
20-24	25776	25664	50440	15	15	30	514	894	1408	31404	20647	52051
25-29	41237	23948	65185	32	16	48	1514	894	2408	40221	24231	64452
30-34	26220	22268	48488	43	20	63	774	783	1557	28473	24726	53199
35-39	18141	16450	34591	57	26	83	674	583	1257	24552	18843	43395
40-44	14348	13141	27490	56	26	82	194	117	311	16349	13996	30345
45-49	11038	9274	20312	20	14	34	107	83	190	11628	9337	21125
50-54	9064	7526	16570	64	37	101	-34	-20	-54	9269	7879	17148
55-59	7392	6518	13912	114	61	175	-36	-20	-56	7709	6734	14443
60-64	5225	4965	10454	130	64	194	-60	-116	-176	5679	5159	10978
65-69	3202	2998	6200	103	48	151	-102	-187	-289	4353	3176	6529
70-74	1871	1856	3729	103	55	158	-52	-41	-93	1957	1972	3929
75-79	1041	1096	2137	84	55	139	-14	-8	-22	1058	1135	2193
80-84	532	580	1112	58	49	107	-8	-6	-14	470	652	1122
85+	231	373	604	42	57	99	-4	-5	-9	229	369	598
TOTAL	237039	209892	446931	1212	663	1875	5236	3764	9000	246466	218140	464606

FERTILITY MEASURES: 1984 TO 1985

AGE	FEMALES	BIRTHS	RATE
15 - 19	17132	1474	0.0764
20 - 24	25609	3741	0.1823
25 - 29	24221	3323	0.1372
30 - 34	22793	1542	0.0662
35 - 39	19179	565	0.0295
40 - 44	13661	147	0.0108
TOTAL	117788	10950	0.5001

DEPENDENCY RATIOS	1984	1985
CHILD DEPENDENCY RATIO	48.46	48.38
AGED DEPENDENCY RATIO	4.68	4.75
TOTAL DEPENCENCY RATIO	53.15	53.13
SEX RATIO	112.93	112.99
MALE LIFE EXPECTANCY	79.51	
FEMALE LIFE EXPECTANCY	77.91	
TOTAL FERTILITY	2.3007	
GENERAL FERTILITY	84.5692	

Table III.5
Series B
Components of Change For The Total Population
1980-1981

AGE	1980 BASE POPULATION MALE	FEMALE	TOTAL	DEATHS MALE	FEMALE	TOTAL	MIGRATION MALE	FEMALE	TOTAL	1981 ESTIMATED POPULATION MALE	FEMALE	TOTAL
0- 1	4406	4211	8617	74	56	130	-22	-21	-43	4800	4587	9387
1- 4	15447	14775	30222	14	11	25	-74	-70	-144	16401	15687	32088
5- 9	17613	16866	34479	14	10	24	-86	-82	-168	17027	16306	33333
10-14	17749	16668	34417	13	10	23	-88	-81	-169	17829	16821	34650
15-19	19316	16759	36095	31	15	46	-194	-133	-327	19519	16954	36473
20-24	24615	20750	45389	49	15	64	306	285	591	25417	20562	45979
25-29	25634	23437	49071	41	15	56	502	-96	598	25161	23691	48852
30-34	22413	18711	41124	41	17	58	155	-18	137	23102	19840	42942
35-39	17084	14393	31477	41	19	60	49	47	96	17721	14289	32010
40-44	12440	10144	22584	47	24	71	-93	-83	-176	12679	10614	23293
45-49	9575	8407	18382	64	31	95	-90	-78	-168	10133	8594	18727
50-54	8799	7060	15849	87	38	125	-126	-59	-185	8828	7043	15877
55-59	6680	5863	12543	99	44	143	-91	-77	-168	6836	6015	12851
60-64	4444	3951	8395	100	45	145	-100	-122	-222	4694	4247	8941
65-69	2841	2567	5408	99	44	143	-97	-92	-189	2918	2669	5587
70-74	1611	1536	3147	83	46	129	-35	-45	-80	1704	1607	3311
75-79	885	943	1828	65	45	110	-12	-10	-22	909	990	1899
80-84	355	415	770	34	27	61	-6	-5	-11	389	443	832
85+	247	367	614	41	51	92	-3	-4	-7	251	378	629
TOTAL	212588	187823	400411	1037	563	1600	-105	-552	-657	216318	191343	407661

FERTILITY MEASURES: 1980 TO 1981

AGE	FEMALES	BIRTHS	RATE
15 - 19	16735	1180	0.0705
20 - 24	20285	3501	0.1726
25 - 29	23788	3095	0.1301
30 - 34	19358	1215	0.0628
35 - 39	14358	401	0.0280
40 - 44	10482	108	0.0102
TOTAL	105006	9500	0.4742

DEPENDENCY RATIOS	1980	1981
CHILD DEPENDENCY RATIO	49.77	49.41
AGED DEPENDENCY RATIO	4.53	4.63
TOTAL DEPENDENCY RATIO	54.30	54.04
SEX RATIO	113.19	113.05
MALE LIFE EXPECTANCY	70.96	
FEMALE LIFE EXPECTANCY	78.40	
TOTAL FERTILITY	2.3709	
GENERAL FERTILITY	90.4710	

1981-1982

AGE	1981 BASE POPULATION MALE	FEMALE	TOTAL	DEATHS MALE	FEMALE	TOTAL	MIGRATION MALE	FEMALE	TOTAL	1982 ESTIMATED POPULATION MALE	FEMALE	TOTAL
0- 1	4800	4587	9387	79	60	139	-34	-32	-66	4925	4706	9631
1- 4	16401	15687	32088	14	11	25	-118	-114	-232	17272	16518	33790
5- 9	17027	16306	33333	13	10	23	-121	-115	-236	16999	16278	33277
10-14	17829	16821	34650	13	10	23	-128	-120	-248	17861	16958	34819
15-19	19519	16954	36473	31	15	46	-204	-142	-346	19607	17004	36611
20-24	25417	20562	45979	49	15	64	493	290	783	26431	20181	46612
25-29	25161	23691	48852	40	15	55	450	29	479	23898	23798	47696
30-34	23102	19840	42942	43	19	62	108	-70	38	23666	19300	43056
35-39	17721	14289	32010	41	19	60	10	18	28	19871	15911	34682
40-44	12679	10614	23293	47	24	71	-132	-117	-249	12979	11255	24184
45-49	10133	8594	18727	66	32	98	-125	-109	-234	10342	8732	19074
50-54	8828	7049	15877	89	37	126	-160	-82	-242	8742	7032	15774
55-59	6836	6015	12851	101	43	144	-116	-98	-214	6968	6118	13086
60-64	4694	4247	8941	108	48	156	-126	-155	-281	4915	4487	9402
65-69	2918	2669	5587	101	45	146	-123	-116	-239	3001	2707	5708
70-74	1704	1607	3311	92	50	142	-41	-59	-105	1753	1703	3456
75-79	909	990	1899	74	53	127	-21	-20	-41	931	1091	1932
80-84	389	443	832	48	42	90	-6	-3	-9	414	468	882
85+	251	378	629	45	56	101	-6	-5	-11	239	380	619
TOTAL	216318	191343	407661	1096	604	1700	-406	-1019	-1425	219814	194477	414291

FERTILITY MEASURES: 1981 TO 1982

AGE	FEMALES	BIRTHS	RATE
15 - 19	16858	1215	0.0721
20 - 24	20009	3532	0.1767
25 - 29	23965	3190	0.1331
30 - 34	19698	1265	0.0642
35 - 39	15068	432	0.0287
40 - 44	11013	116	0.0105
TOTAL	106602	9750	0.4852

DEPENDENCY RATIOS	1981	1982
CHILD DEPENDENCY RATIO	49.41	49.17
AGED DEPENDENCY RATIO	4.63	4.68
TOTAL DEPENDENCY RATIO	54.04	53.85
SEX RATIO	113.05	113.03
MALE LIFE EXPECTANCY	70.50	
FEMALE LIFE EXPECTANCY	77.96	
TOTAL FERTILITY	2.4259	
GENERAL FERTILITY	91.4617	

Table III.5
(Continued)
1982-1983

1982

BASE POPULATION

AGE	MALE	FEMALE	TOTAL
0- 1	4925	4706	9631
1- 4	17272	16518	33790
5- 9	16999	16278	33277
10-14	17861	16958	34819
15-19	19607	17004	36611
20-24	26431	20181	46612
25-29	23898	23798	47696
30-34	23666	19390	43056
35-39	18871	15811	34682
40-44	12979	11205	24184
45-49	10342	8732	19074
50-54	8742	7033	15774
55-59	6968	6118	13086
60-64	4915	4487	9402
65-69	3001	2707	5708
70-74	1753	1703	3456
75-79	931	1001	1932
80-84	414	468	882
85+	239	380	619
TOTAL	219814	194477	414291

DEATHS MALE	DEATHS FEMALE	DEATHS TOTAL
82	61	143
14	13	27
12	10	22
13	10	23
31	15	46
51	15	66
37	17	54
43	18	61
45	21	66
48	26	74
66	33	99
86	39	125
107	47	154
118	49	167
108	45	153
96	50	146
80	52	132
50	41	91
44	57	101
1131	619	1750

MIGRATION MALE	MIGRATION FEMALE	MIGRATION TOTAL
-39	-36	-75
-134	-129	-263
-129	-124	-253
-143	-134	-277
-205	-149	-354
520	263	783
379	-2	377
92	-88	4
-3	9	6
-149	-135	-284
-138	-119	-257
-168	-89	-257
-121	-99	-220
-134	-171	-305
-131	-119	-250
-50	-63	-113
-22	-22	-44
-7	-3	-10
-5	-5	-10
-587	-1215	-1802

1983

ESTIMATED POPULATION

MALE	FEMALE	TOTAL
5050	4827	9877
18047	17256	35303
17382	16642	34024
17972	17053	35025
19011	16597	35608
27373	20064	47437
22051	23227	45278
24644	19934	44578
19944	16760	36704
13800	11815	25615
10506	8864	19370
8726	7131	15857
7117	6236	13353
5104	4637	9741
3088	2807	5895
1782	1751	3533
965	1021	1986
425	525	950
232	375	607
223219	197522	420741

FERTILITY MEASURES: 1982 TO 1983

AGE	FEMALES	BIRTHS	RATE
15 - 19	16665	1239	0.0743
20 - 24	15750	3045	0.1820
25 - 29	23733	3252	0.1371
30 - 34	19748	1307	0.0662
35 - 39	16303	481	0.0295
40 - 44	11613	126	0.0108
TOTAL	107827	10000	0.4598

DEPENDENCY RATIOS	1982	1983
CHILD DEPENDENCY RATIO	49.17	49.05
AGED DEPENDENCY RATIO	4.68	4.74
TOTAL DEPENDENCY RATIO	53.85	53.79
SEX RATIO	113.03	113.01
MALE LIFE EXPECTANCY	70.47	
FEMALE LIFE EXPECTANCY	77.92	
TOTAL FERTILITY	2.4991	
GENERAL FERTILITY	92.7411	

1983-1984

1983

BASE POPULATION

AGE	MALE	FEMALE	TOTAL
0- 1	5050	4827	9877
1- 4	18047	17256	35303
5- 9	17382	16642	34024
10-14	17972	17053	35025
15-19	19011	16597	35608
20-24	27373	20064	47437
25-29	22051	23227	45278
30-34	24644	19934	44578
35-39	19944	16760	36704
40-44	13800	11815	25615
45-49	10506	8864	19370
50-54	8726	7131	15857
55-59	7117	6236	13353
60-64	5104	4637	9741
65-69	3088	2807	5895
70-74	1782	1751	3533
75-79	965	1021	1986
80-84	425	525	950
85+	232	375	607
TOTAL	223219	197522	420741

DEATHS MALE	DEATHS FEMALE	DEATHS TOTAL
88	64	152
14	13	27
13	10	23
13	10	23
31	15	46
53	15	68
34	17	51
45	18	63
48	21	69
51	29	80
69	34	103
92	38	130
111	48	159
122	52	174
114	52	166
97	57	154
81	57	138
68	47	105
42	57	99
1176	654	1830

MIGRATION MALE	MIGRATION FEMALE	MIGRATION TOTAL
-41	-40	-81
-145	-139	-284
-137	-129	-266
-147	-137	-284
-209	-151	-360
548	250	798
334	-11	323
95	-98	-3
-9	3	-6
-162	-148	-311
-144	-122	-266
-169	-92	-261
-125	-104	-229
-140	-181	-321
-139	-123	-262
-52	-66	-118
-25	-21	-46
-7	-5	-12
-6	-5	-11
-681	-1319	-2000

1984

ESTIMATED POPULATION

MALE	FEMALE	TOTAL
5200	4970	10170
18764	17943	36707
18099	17324	35423
17620	16869	34489
18701	16393	35094
28382	19694	48076
20146	22568	42714
25367	20997	46364
21310	17443	38753
14555	12533	27088
10641	8921	19562
8737	7253	15990
7169	6313	13482
5385	4708	10193
3103	2881	5984
1811	1786	3597
979	1050	2029
439	564	1003
229	374	603
226637	200574	427211

FERTILITY MEASURES: 1983 TO 1984

AGE	FEMALES	BIRTHS	RATE
15 - 19	16374	1260	0.0770
20 - 24	15508	3644	0.1885
25 - 29	23116	3287	0.1422
30 - 34	20500	1407	0.0686
35 - 39	17121	525	0.0306
40 - 44	12279	137	0.0112
TOTAL	108897	10300	0.5185

DEPENDENCY RATIOS	1983	1984
CHILD DEPENDENCY RATIO	49.05	49.08
AGED DEPENDENCY RATIO	4.74	4.76
TOTAL DEPENDENCY RATIO	53.79	53.84
SEX RATIO	113.01	112.99
MALE LIFE EXPECTANCY	70.05	
FEMALE LIFE EXPECTANCY	77.51	
TOTAL FERTILITY	2.5923	
GENERAL FERTILITY	94.5848	

Table III.5
(Continued)
1984-1985

AGE	1984 BASE POPULATION MALE	FEMALE	TOTAL	DEATHS MALE	FEMALE	TOTAL	MIGRATION MALE	FEMALE	TOTAL	1985 ESTIMATED POPULATION MALE	FEMALE	TOTAL
0- 1	5200	4970	10170	90	66	156	-44	-42	-86	5326	5091	10417
1- 4	18764	17943	36707	15	14	29	-159	-152	-311	19507	18655	38163
5- 9	18039	17324	35423	13	10	23	-144	-138	-282	19067	18244	37311
10-14	17620	16869	34489	13	11	24	-141	-135	-276	16905	16196	33101
15-19	18921	16393	35314	32	15	47	-218	-154	-372	18681	16426	35107
20-24	28342	19694	48076	55	15	70	577	225	802	29185	19202	48387
25-29	20146	22568	42714	32	16	48	302	-14	288	18566	21901	40467
30-34	25367	20897	46264	46	20	66	-51	-112	-21	25942	22045	47987
35-39	21310	17443	38753	49	25	74	-14	0	-14	22551	18235	40787
40-44	14555	12533	27088	54	28	82	-178	-163	-341	15046	12992	28079
45-49	10641	8921	19562	69	33	102	-145	-124	-269	10829	8961	19760
50-54	8737	7253	15990	93	39	132	-168	-91	-259	8770	7477	16247
55-59	7169	6313	13482	114	51	165	-131	-110	-241	7350	6422	13772
60-64	5385	4798	10183	131	52	183	-154	-191	-345	5458	4951	10409
65-69	3103	2881	5984	115	51	166	-146	-132	-278	3201	2995	6196
70-74	1811	1786	3597	100	58	158	-56	-68	-124	1869	1859	3727
75-79	979	1050	2029	86	60	146	-25	-23	-48	1009	1070	2079
80-84	439	564	1003	55	49	104	-7	-5	-12	472	623	1095
85+	229	374	603	42	59	100	-6	-5	-11	226	370	596
TOTAL	226637	200574	427211	1204	671	1875	-766	-1434	-2200	230070	203616	433686

FERTILITY MEASURES: 1984 TO 1985

AGE	FEMALES	BIRTHS	RATE
15 - 19	16251	1494	0.0794
20 - 24	15076	3721	0.1950
25 - 29	22442	3295	0.1468
30 - 34	21557	1528	0.0705
35 - 39	17858	563	0.0316
40 - 44	12865	149	0.0115
TOTAL	116049	10550	0.5352

DEPENDENCY RATIOS	1984	1985
CHILD DEPENDENCY RATIO	49.08	49.45
AGED DEPENDENCY RATIO	4.76	4.87
TOTAL DEPENDENCY RATIO	53.84	54.32
SEX RATIO	112.99	112.99
MALE LIFE EXPECTANCY	70.05	
FEMALE LIFE EXPECTANCY	77.49	
TOTAL FERTILITY	2.6761	
GENERAL FERTILITY	95.8228	

Table III.6
Series C
Components of Change For The Total Population
1980-1981

1980 BASE POPULATION

AGE	MALE	FEMALE	TOTAL
0- 1	4406	4211	8617
1- 4	15447	14775	30222
5- 9	17613	16866	34479
10-14	17749	16668	34417
15-19	19336	16759	36095
20-24	24639	20750	45389
25-29	25634	23437	49071
30-34	22413	18711	41124
35-39	17094	14393	31477
40-44	12440	10144	22584
45-49	9979	8407	18382
50-54	8789	7060	15849
55-59	6680	5863	12543
60-64	4444	3951	8395
65-69	2841	2567	5408
70-74	1611	1536	3147
75-79	882	946	1828
80-84	329	415	770
85+	247	367	614
TOTAL	212588	187823	400411

	MALE	FEMALE	TOTAL
DEATHS	1037	563	1600
MIGRATION	350	-397	-7

1981 ESTIMATED POPULATION

MALE	FEMALE	TOTAL
4823	4597	9397
16303	15677	31967
17010	16290	33300
17811	16803	34614
19547	16991	36538
25744	20760	46506
25371	23786	49157
23142	19856	43038
17762	14317	32079
12677	10606	23283
10120	8572	18692
8801	7031	15832
6817	6000	12817
4672	4213	8885
2883	2629	5511
1685	1593	3278
960	978	1938
306	463	769
249	376	625
216813	191498	408311

FERTILITY MEASURES: 1980 TO 1981

AGE	FEMALES	BIRTHS	RATE
15 - 19	16759	1179	0.0703
20 - 24	20186	3510	0.1722
25 - 29	23826	3091	0.1258
30 - 34	19368	1213	0.0626
35 - 39	14372	403	0.0279
40 - 44	10476	137	0.0102
TOTAL	105187	9530	0.4729

DEPENDENCY RATIOS

	1980	1981
CHILD DEPENDENCY RATIO	49.77	49.22
AGED DEPENDENCY RATIO	4.53	4.56
TOTAL DEPENDENCY RATIO	54.30	53.78
SEX RATIO	113.19	113.22
MALE LIFE EXPECTANCY	70.96	
FEMALE LIFE EXPECTANCY	78.40	
TOTAL FERTILITY	2.3647	
GENERAL FERTILITY	90.3153	

1981-1982

1981 BASE POPULATION

AGE	MALE	FEMALE	TOTAL
0- 1	4830	4587	9387
1- 4	16350	15677	32367
5- 9	17010	16290	33300
10-14	17811	16803	34614
15-19	19554	16991	36545
20-24	25746	20760	46506
25-29	25371	23786	49157
30-34	23161	19856	43018
35-39	17762	14317	32079
40-44	12677	10606	23283
45-49	10120	8572	18692
50-54	8801	7031	15832
55-59	6817	6000	12817
60-64	4672	4213	8885
65-69	2883	2629	5511
70-74	1685	1593	3278
75-79	900	938	1838
80-84	306	463	769
85+	249	376	625
TOTAL	216813	191498	408311

	MALE	FEMALE	TOTAL
DEATHS	1100	600	1700
MIGRATION	353	-398	-5

1982 ESTIMATED POPULATION

MALE	FEMALE	TOTAL
4924	4724	9648
17294	16540	33834
17005	16286	33291
17873	16969	34842
19682	17070	36752
24869	20950	45819
24403	24079	43482
23089	19477	42566
17000	14205	31205
13019	11232	24251
10348	9716	20064
8727	7920	16647
6950	6139	13089
4896	4482	9378
2952	2647	5599
1710	1662	3372
973	949	1922
408	568	976
237	379	615
221134	195257	416391

FERTILITY MEASURES: 1981 TO 1982

AGE	FEMALES	BIRTHS	RATE
15 - 19	16915	1209	0.0715
20 - 24	20282	3533	0.1742
25 - 29	24144	3195	0.1323
30 - 34	19751	1258	0.0637
35 - 39	15128	429	0.0284
40 - 44	11020	114	0.0104
TOTAL	107245	9750	0.4816

DEPENDENCY RATIOS

	1981	1982
CHILD DEPENDENCY RATIO	49.22	48.83
AGED DEPENDENCY RATIO	4.56	4.56
TOTAL DEPENDENCY RATIO	53.78	53.38
SEX RATIO	113.22	113.24
MALE LIFE EXPECTANCY	72.48	
FEMALE LIFE EXPECTANCY	77.93	
TOTAL FERTILITY	2.4051	
GENERAL FERTILITY	90.9099	

Table III.6
(Continued)
1982-1983

1982

AGE	BASE POPULATION MALE	FEMALE	TOTAL	DEATHS MALE	FEMALE	TOTAL	MIGRATION MALE	FEMALE	TOTAL	1983 ESTIMATED POPULATION MALE	FEMALE	TOTAL
0 - 1	4924	4706	9630	83	61	144	-27	-25	-52	5060	4727	9877
1 - 4	17294	16540	33834	14	13	27	-63	-89	-152	18103	17312	35415
5 - 9	17035	16286	33321	12	10	22	-94	-92	-186	17429	16688	34117
10-14	17873	16969	34842	13	10	23	-104	-100	-204	18030	17134	35164
15-19	15682	17070	32752	31	15	46	-100	-60	-160	15517	16686	32203
20-24	26868	20550	47418	54	15	69	735	502	1237	27024	20693	47717
25-29	24403	24079	48482	37	18	55	511	142	753	22742	23738	46480
30-34	23889	19479	43368	43	18	61	238	6	244	25071	20131	45202
35-39	19000	15905	34905	45	21	66	34	84	182	20191	16960	37151
40-44	13019	11232	24251	48	31	79	-103	-104	-207	13515	11904	25419
45-49	10348	8716	19064	66	30	96	-110	-103	-213	10557	8863	19420
50-54	8727	7020	15747	90	38	128	-151	-74	-225	8732	7134	15866
55-59	6950	6139	13089	108	46	154	-114	-93	-207	7103	6239	13342
60-64	4994	4452	9446	118	48	166	-138	-177	-315	6085	4414	10499
65-69	2992	2647	5639	108	45	154	-141	-134	-275	3087	2754	5841
70-74	1710	1462	3172	93	42	142	-56	-72	-128	1774	1497	3271
75-79	823	739	1562	78	52	130	-21	-19	-40	896	1003	1899
80-84	428	448	876	49	40	89	-9	-3	-12	418	476	894
85+	237	378	615	43	57	100	-6	-6	-12	230	372	602
TOTAL	221194	195257	416451	1134	616	1750	411	-413	-2	229504	199107	428611

FERTILITY MEASURES: 1982 TO 1983

AGE	FEMALES	BIRTHS	RATE
15 - 19	16768	1226	0.0731
20 - 24	20203	3621	0.1793
25 - 29	24122	3256	0.1350
30 - 34	19895	1296	0.0651
35 - 39	16439	477	0.0290
40 - 44	11668	124	0.0106
TOTAL	109090	10000	0.4921

DEPENDENCY RATIOS	1982	1983
CHILD DEPENDENCY RATIO	48.93	48.52
AGED DEPENDENCY RATIO	4.26	4.58
TOTAL DEPENDENCY RATIO	53.18	53.10
SEX RATIO	113.24	113.26
MALE LIFE EXPECTANCY	70.39	
FEMALE LIFE EXPECTANCY	77.82	
TOTAL FERTILITY	2.4606	
GENERAL FERTILITY	91.6674	

1983-1984

1983

AGE	BASE POPULATION MALE	FEMALE	TOTAL	DEATHS MALE	FEMALE	TOTAL	MIGRATION MALE	FEMALE	TOTAL	1984 ESTIMATED POPULATION MALE	FEMALE	TOTAL
0 - 1	5050	4827	9877	89	65	154	-15	-15	-30	5147	4979	10169
1 - 4	18123	17312	35415	14	13	27	-53	-42	-133	18905	18079	36984
5 - 9	17429	16688	34117	13	11	24	-49	-46	-95	14244	17663	35727
10-14	18030	17134	35164	13	10	23	-62	-55	-117	17763	17207	34772
15-19	16817	16686	33503	32	15	47	-145	-84	-229	13842	16522	34363
20-24	24024	20693	44717	60	15	75	492	323	815	24935	21180	46115
25-29	22742	23738	46480	54	17	71	439	131	568	23862	23289	47152
30-34	25071	20131	45202	44	20	64	235	27	262	24054	21261	47269
35-39	20191	16960	37151	45	21	66	106	98	204	21705	17727	39439
40-44	13515	11904	25419	51	28	79	-78	-82	-160	14749	12722	27517
45-49	10557	8863	19420	73	34	107	-86	-75	-161	13750	8979	19727
50-54	8732	7134	15866	92	39	131	-120	-54	-174	8401	7292	16293
55-59	7103	6239	13342	110	49	159	-94	-74	-168	7190	6443	13519
60-64	5085	4811	9896	123	55	178	-113	-146	-259	5393	4828	10221
65-69	3037	2729	5766	111	50	161	-114	-102	-216	3085	2911	4874
70-74	1724	1697	3421	94	51	145	-38	-50	-88	1769	1747	3516
75-79	956	1033	1989	79	52	131	-16	-11	-27	975	1039	2014
80-84	488	526	964	55	48	103	-8	-5	-13	440	522	1312
85+	230	372	602	45	59	104	-4	-5	-9	223	367	590
TOTAL	225504	199107	424611	1177	653	1830	278	-278	0	229880	203291	433171

FERTILITY MEASURES: 1983 TO 1984

AGE	FEMALES	BIRTHS	RATE
15 - 19	16487	1662	0.0754
20 - 24	20017	3705	0.1850
25 - 29	23736	3304	0.1392
30 - 34	20779	1394	0.0671
35 - 39	17221	240	0.0229
40 - 44	12414	155	0.0124
TOTAL	110702	10300	0.5076

DEPENDENCY RATIOS	1983	1984
CHILD DEPENDENCY RATIO	48.52	48.56
AGED DEPENDENCY RATIO	4.58	4.62
TOTAL DEPENDENCY RATIO	53.10	53.19
SEX RATIO	113.26	113.13
MALE LIFE EXPECTANCY	70.06	
FEMALE LIFE EXPECTANCY	77.50	
TOTAL FERTILITY	2.5379	
GENERAL FERTILITY	92.6754	

Table III.8
(Continued)
1984-1985

1984

AGE	BASE POPULATION MALE	FEMALE	TOTAL	DEATHS MALE	FEMALE	TOTAL	NET MIGRATION MALE	FEMALE	TOTAL	1985 ESTIMATED POPULATION MALE	FEMALE	TOTAL
0 - 1	5192	4974	10166	52	45	96	-16	-13	-29	5124	4916	10040
1 - 4	18209	17479	35688	14	14	28	-44	-43	-87	18151	17422	35573
5 - 9	19244	18268	37512	13	11	24	-48	-47	-95	19183	18210	37393
10 - 14	19763	18539	38302	13	11	24	-53	-51	-104	19697	18477	38174
15 - 19	18642	17522	36164	17	10	27	-143	-84	-227	18482	17428	35910
20 - 24	20933	21110	42043	22	9	31	208	236	444	21119	21337	42456
25 - 29	20962	21206	42168	22	9	31	503	33	536	21443	21230	42673
30 - 34	20004	21126	41130	22	9	31	253	25	278	21274	21142	42416
35 - 39	17708	18763	36471	22	9	31	-82	-29	-111	17604	18725	36329
40 - 44	14788	15765	30553	22	9	31	-82	-29	-111	14684	15727	30411
45 - 49	10755	8979	19734	22	9	31	-82	-84	-166	10651	8886	19537
50 - 54	8831	9242	18073	22	9	31	-82	-59	-141	8727	9174	17901
55 - 59	7195	6345	13540	22	9	31	-120	-53	-173	7053	6283	13336
60 - 64	6392	5606	11998	22	9	31	-96	-79	-175	6274	5518	11792
65 - 69	5268	4813	10081	22	9	31	-121	-153	-274	5125	4651	9776
70 - 74	3764	3749	7513	22	9	31	-146	-107	-253	3596	3733	7329
75 - 79	2179	2538	4717	22	9	31	-146	-152	-298	2011	2377	4388
80 - 84	1148	1534	2682	22	9	31	-146	-153	-299	980	1372	2352
85+	573	1034	1607	22	9	31	-18	-6	-24	533	1019	1552
TOTAL	229889	233231	463120	1203	672	1875	305	-305	0	234369	232171	466540

FERTILITY ASSUMPTIONS 1984 TO 1985

AGE	FEMALES	BIRTHS	RATE
15 - 19	16446	1674	0.0774
20 - 24	16847	3214	0.1963
25 - 29	23252	3351	0.1442
30 - 34	23021	1521	0.0660
35 - 39	18220	521	0.0286
40 - 44	13125	149	0.0112
TOTAL	112591	10554	0.5219

DEPENDENCY RATIOS	1984	1985
CHILD DEPENDENCY RATIO	48.96	48.87
AGED DEPENDENCY RATIO	4.02	4.75
TOTAL DEPENDENCY RATIO	53.15	53.62
SEX RATIO	113.13	113.93
MALE LIFE EXPECTANCY	77.49	
FEMALE LIFE EXPECTANCY	77.49	
TOTAL FERTILITY	4.9025	
GENERAL FERTILITY	51.9183	

Table III.7
Calibration Accuracy of Population Model to 1980 Census Data By Age, Race, and Sex

Age	WHITE POPULATION				NON-WHITE POPULATION			
	Males: Difference, Model - Census		Females: Difference, Model - Census		Males: Difference, Model - Census		Females: Difference, Model - Census	
	Absolute	Percent	Absolute	Percent	Absolute	Percent	Absolute	Percent
0-4	-86	-0.60	117	0.86	-5	-0.09	36	0.69
5-9	-340	-2.61	-128	-1.04	56	1.15	-26	-0.55
10-14	125	0.98	127	1.07	0	0.00	-1	-0.02
15-19	-414	-2.91	-481	-3.97	7	0.13	3	0.06
20-24	457	2.50	-155	-0.98	29	0.49	0	0.00
25-29	98	0.48	424	2.30	7	0.14	0	0.00
30-34	-113	-0.60	-644	-4.08	-35	-0.94	0	0.00
35-39	90	0.63	213	1.84	-7	-0.26	-1	-0.04
40-44	18	0.18	-16	-0.20	12	0.55	0	0.00
45-49	3	0.04	7	0.11	16	0.88	1	0.06
50-54	78	1.08	-71	-1.26	27	1.84	14	0.95
55-59	-119	-2.15	16	0.34	30	2.42	24	2.11
60-64	110	3.14	121	4.13	37	4.67	32	3.70
65-69	71	3.55	78	4.43	39	5.34	29	4.15
70-74	37	3.49	-51	-4.52	33	6.86	19	4.32
75-79	-16	-2.78	-34	-5.12	17	5.50	18	6.10
80-84	-3	-1.28	-11	-3.79	8	6.96	7	5.43
85+	8	5.52	-9	-3.41	-8	-7.84	5	4.67
Total	4	0.002	-497	-0.35	263	0.55	160	0.36

TOTAL POPULATION MODEL	TOTAL POPULATION CENSUS*	Difference Absolute	Difference Percent
400,411	400,481	-70	-0.02

*The uncorrected census count of 400,481 was used because the corrected total (401,851) released by the U.S. Bureau of the Census did not include corrections for age, race and sex.

Table III.8
1980 Base Population By Age, Race, and Sex, Used in the Projection Scenarios

AGE	---TOTAL--- TOTAL	MALE	FEMALE	---WHITE--- TOTAL	MALE	FEMALE	--NONWHITE-- TOTAL	MALE	FEMALE	AGE
TOTAL	400411	212588	187823	307962	164920	143042	92449	47668	44781	TOTAL
0- 4	28819	14853	13966	20074	10355	9719	8745	4498	4247	0- 4
5- 9	24478	12613	11864	17678	9122	8556	6800	3491	3309	5- 9
10-14	24417	12749	11668	17810	9226	8584	6607	3523	3084	10-14
15-19	26045	13436	12609	19436	9900	9536	6609	3536	3073	15-19
20-24	28889	14839	14050	21552	10740	10812	7337	4099	3238	20-24
25-29	41071	20634	20437	30652	16602	14050	10419	4032	6387	25-29
30-34	41129	20512	20617	30681	16474	14207	10448	4038	6410	30-34
35-39	35442	17604	17838	26167	14369	11798	9275	3235	6040	35-39
40-44	29462	14644	14818	21857	10749	11108	7605	3895	3710	40-44
45-49	23243	11568	11675	17250	8152	9098	5993	3416	2577	45-49
50-54	19242	9435	9807	14270	6913	7357	4972	2522	2450	50-54
55-59	16849	8789	8060	12074	5798	6276	4775	2991	1784	55-59
60-64	14242	6980	7262	10112	4908	5204	4130	2072	2058
65-69	11329	5544	5785	8067	3915	4152	3262	1629	1633
70-74	8220	3924	4296	5774	2691	3083	2446	1233	1213
75-79	5147	2611	2536	3789	1755	2034	1358	856	502
80-84	2928	1385	1543	1989	946	1043	939	439	500
85+	1770	817	953	1208	561	647	562	256	306

IV. SPECIAL REPORTS

IV.A Descriptive Reports

THE ANNUAL POPULATION DETERMINATION PROGRAM

Terrence May, Department of Community and Regional Affairs, State of Alaska

The Department of Community and Regional Affairs, through its Local Government Assistance Division, is one of several agencies which annually produces population estimates for Alaska's 151 municipalities. Population figures certified by the Department are used annually as the basis for allocating State Revenue Sharing funds and Municipal Assistance funds, the two major programs of general State aid to municipalities. During the 1982 fiscal year, the two programs will make available over $140 million in financial assistance to local governments to augment their capability to provide essential public services and reduce property taxes.

Funding for both programs has expanded substantially over the years. As the distribution of an ever increasing amount of State funds is tied to population data, the need for accurate and reliable figures has become a paramount concern. Without population data of high quality, funds which are distributed using a per capita or quasi-per capita formula cannot be allocated in a fair and equitable manner. Use of suspect population figures would also cause the two programs to lose their credibility.

The Department's population estimates are also used by the Office of the State Assessor for such purposes as estimating the per capita general obligation debt, per capita property taxes, and per capita assessed valuation for each unit of local government and the state as a whole. These determinations would not present a realistic portrayal of actual conditions if reliable population data were not available.

In the past, the Department relied mainly upon estimates provided to it by the various municipalities and population counts conducted by small cities for data on which to base its annual population determinations. This practice has been followed since the State Revenue Sharing program began its first year of operation in the 1971 fiscal year. According to the regulations in effect throughout the past ten years, population estimates were to be based on the latest official census count (1970) as adjusted in successive years. The estimates prepared by municipalities had to be based on at least three reliable indicators of population—such as school enrollment, utility connections, and the number of persons employed—all of which were to show a similar rate of change over the previous year. The Department's role was limited for the most part to approving or rejecting estimates submitted by municipalities in keeping with those requirements.

With the release of preliminary decennial census data for Alaska and its 151 municipalities by the United States Bureau of the Census in the fall of 1980, it became apparent that the Department's population July 1, 1980 estimates in most instances substantially exceeded the actual enumerated population. Because of the sizeable variance between the 1980 municipal estimates and the U.S. Bureau of the Census counts, there was considerable concern in some quarters particularly among municipal officials—that the decennial census had substantially undercounted persons residing in Alaska. This caused the Department to begin a thorough and systematic review of its population estimation methodology, data, and assumptions. Assistance in this effort was sought from the newly hired State Demographer assigned to the Research and Analysis Section of the Alaska Department of Labor. It was hoped at the time that with his advice and assistance, the Department's population estimation program could be strengthened and improved.

In reviewing the Department's population estimation policy and procedure over the past decade, it was noted that the program was beset with at least eight major problems, including:

1. The use of dissimilar methods, data, definitions and technical standards which lead to estimates that were of varying quality and reliability, and which could not be objectively verified;

2. Some of the data series used (for example, certified employment rolls, registered voters, post office boxes, building permits, residential water and sewer hookups, automobile registrations, etc.) were suspect as reliable indicators of population and combinations of data were often selectively used to obtain the highest possible estimate of population;

3. Population adjustments were incremental over time and not continually referenced to a decennial census benchmark so that errors made in past years were compounded over succeeding years;

4. Estimation methods could not be used to check the accuracy of the 1980 decennial census because the data used by municipalities to prepare estimates was incompatible;

5. Previous regulations in force precluded the Department from adjusting local population estimates on its own initiative even if the population of a municipality was known to have declined, and municipalities with a declining population had no interest in challenging a previous years' estimate;

6. Municipalities which inflated their population estimates received a disproportionate share of State Revenue Sharing and Municipal Assistance funds at the expense of small cities which took an accurate census;

7. In the absence of a critical review procedure, municipalities tended to be optimistic in preparing population estimates in the mistaken belief that higher numbers would mean more state-shared revenues and increased prestige; and, finally,

8. The Department lacked the demographic expertise needed to design and carry out a well-structured population estimates program.

In recognition of the nature and scope of these problems, as well as the need for improvements, the Department has been collaborating with the State Demographer for almost a year to introduce needed changes. During this period, for example, the following steps have been taken toward that end:

1. The Department has revised its regulations to more clearly articulate the population estimation procedure, including among other things, emphasis on the use of the U.S. Bureau of the Census definitions and standards;

2. Two training sessions were held in the spring—one in Juneau, the other in Anchorage—to provide municipal personnel with practical training in the use of the Housing Unit Method of population estimation to pave the way for the widespread implementation of this method which is regarded as superior to previous estimation methods used by municipalities;

3. The State Demographer has consulted with Department staff responsible for verifying population estimates to review operating methods and to certify the estimates produced by municipalities;

4. Both the State Demographer and the Department have instituted a State-assisted census program which provides technical assistance and training to municipalities interested in taking a special census;

5. The Department, under the direction of chairperson Commissioner Lee McAnerney, has been an active participant in the Census Coordinating Committee which laid the groundwork for the state-federal cooperation during the 1980 decennial census.

In 1981, the State Demographer produced a complete set of population estimates by municipalities and other sources. A significant number of municipalities did not chose to conduct a census or prepare an estimate; in these cases, the State Demographer developed an estimate from available data using a standardized methodology.

The prospectus is for continued close cooperation between the Department and the State Demographer in the months ahead to improve the municipal population estimates program. Plans are being made to offer workshops this spring dealing with population estimation methods and their practical application, and training on how to conduct a population census. Municipalities are encouraged to participate actively in the Department's population estimation program by submitting data needed to produce reliable and timely estimates. The emphasis will be on keeping discussion at a technical level. Preliminary population determinations of the Department will be sent to municipalities in mid-October and final population determinations will be released in mid-December. The interim will serve as an appeal period during which municipalities may contest the Department's preliminary figures and provide evidence to substantiate their estimates.

Federal-State Cooperative Program for Population Estimates

Jo Van Patten, Alaska Department of Labor

Introduction

As of August 29, 1972, Alaska officially became part of the Federal State Cooperative Program for Population Estimates, (FSCP), a program specifically targeting sub-state area population estimation. Prior to the 1970 census, the main thrust of estimation had been limited to the state and national level. The main objective of the FSCP is to have officially designated state agencies cooperate with the U.S. Bureau of the Census in the preparation of population estimates of sub-state areas by standardized methods, recommended and mutually agreed upon by the States and the Bureau of the Census*. The estimates are accepted as the offical state numbers by the Bureau of the Census and are recommended for use in all Federal programs requiring such estimates. With the passage of the State and Local Fiscal Assistance Act of 1972 (Revenue Sharing) and the proliferation of population-based planning and local revenue sharing efforts, the need for timely and accurate population estimates has become increasingly important. The FSCP has continued to evolve as a major force in standardizing data and methodology, and in providing estimates for sub-state levels which are accurate for small areas as well as cohesive for the country as a whole. Noteworthy also is the fact that this program is in actuality "cooperative". There are no federal dollars supplied to states to fund this program.

Methods

The FSCP estimating program uses three different methods to arrive at its sub-state estimates. All of these methods use Medicare enrollment data to estimate the population over 65, and use military and group quarters population numbers as supplied by the military and the various institutions.

The Component II method uses school enrollment for grades 1-8 as its basis for generating a school-age population and converting this into a migration rate for the entire civiiian population under age 65. This is combined with natural increase (births over deaths) to produce one set of estimates of civilian population under 65. For Alaska, and other states, this method presents difficulties in capturing the childless 20-30 age group which, depending on work availability, is so mobile.

The Administrative Records method generates its migration factor through the match or non-match of addresses with social security numbers on federal income taxes filed in successive years. It was developed especially to meet the need for small area estimates for revenue sharing purposes and is made possible because of the Census Bureau's access to the Internal Revenue Services' master files. This method attempts to address the problem of capturing that portion of the population whose presence is not indicated in school enrollments. Both inter- and intra-state migration information can be generated using this method although the numbers for small areas are unstable and allowances must be made for the non-match of first time filers. As the decade passes, and the the last decennial census becomes outdated, migration fluctuations become even harder to pinpoint.

The third method of inter-censal population estimation used by the FSCP involves a ratio correlation of percent change in the proportion of births and school enrollments of each census area as related to the state totals. These are the only two variables used at this time for the state of Alaska. The sub-state populations are then calculated from a linear estimating equation of the form:

$$y = a + bx_1 + cx_2$$

The numerical values in the equation are coefficients derived from fitting the estimating equation to the corresponding data for the years 1970 and 1980 (for the 80's decade). The coefficients indicate the relationship between the change in the population distribution and change in the symptomatic variable (X1, X2).

Role of States in FSCP

The states' role in this cooperative program can be as large or as minimal as the needs of each state dictate. Minimally, states provide school enrollment data and preferably military, and institutional population figures, employment data, motor vehicle registrations, and/or whatever data series information is applicable to a given state. The indicator series are mutually agreed on, with states providing data and the federal people using the data to produce estimates. Each state monitors the use and accuracy of its own data. Additionally, each state may produce its own estimate series with which to compare and challenge those estimates produced by the Bureau. As an alternative check, states may take a census of substate areas to use as a test of the estimates. Alaska is one of the few states (others are Washington, Michigan, Oregon, Florida, and California) which has had its census methodology, quality controls, and administrative procedures reviewed by the Bureau of the Census and approved as producing results compatible with those of the Bureau. For these states certified census tabulations will be used in the set of federal population determinations as well as providing checks on the accuracy of the federal estimation series.

Comparison of Methods

During the decade of the seventies, several revisions were made in the data series used for the estimates. For example, in many states, motor vehicle registrations are no longer used as a population indicator; medicare enrollment figures have become standard for estimating the over 65 population; and fall school enrollments for grades 1-8, in place of grades 2-8, are used for estimating the school age population groups. In addition to changes in the indicator data used, a new method for estimating the migration factor was developed, (used in the Administrative Records method) using match or non-match of addresses on federal income tax returns. As the information from the 1980 census is tabulated and comparisons made with the estimates' series, more revisions can be expected.

In this brief comparison of the estimates produced by the FSCP and the numbers determined by the 1980 census, several factors must be kept in mind: (1) Neither the 1970 or 1980 census figures have been adjusted for undercount. Should it be determined that a particular area, age, racial grouping was substantially undercounted, the estimates for the decade would need to be adjusted accordingly. (2) Each state's sub area estimates are controlled to a state total which is in turn controlled to a national level. The national total was underestimated by approximately 5 million. (3) The Administrative Records series for April 1, 1980 is a pseudo series generated for evaluation purposes only. It was computed by adding the average of the change in population calculated by the other two methods to the 1979 Administrative Records estimate.

A preliminary comparison of methods done by the Bureau of the Census shows the Administrative records method, used alone or averaged with other methods, to be the most accurate estimator of population. For Alaska, the regression method had the lowest average absolute percent error. States with slow growth and migration patterns, such as those in the northeast, showed consistently more accurate estimations, than those areas with high migration rates and high growth areas (Nevada, New Mexico, Alaska). For the state of Alaska, the Administrative Records method picked up the "pipeline" population areas of Fairbanks, North Slope, Upper Yukon, Southeast Fairbanks, and Valdez-Chitina areas most accurately, while the regression method targeted the southeast population of Sitka, Ketchikan, Prince of Wales and Wrangell-Petersburg better. Straight line averaging of the methods improved the accuracy in only 5 instances. The regression method produced the highest number of estimates with a positive deviation (21 out of 29). Controlling the estimates generated by the regression method to the 1980 census state total lowered the average absolute percent error by .35%.

The various series also graphically illustrate the difficulties of population estimation in this state where many of the municipalities have extremely small populations, others have diverse population groupings and still others comprise seasonal occupation areas or have a large proportion of the total population in the military.

Conclusion

With the increasing number of revenue sharing programs undertaken by both state and the federal governments, the accuracy of intercensual estimates can mean many dollars gained or forever lost by revenue

sharing areas. Moreover, equitable determination of these estimates is a must—fast growing areas must be credited with their gain, while stable or declining areas must be identified. As more data become available (and more insight gained into the variables which will pin-point fluctuations with greater speed and accuracy) we can expect revisions to the procedures available through the FSCP.

FOOTNOTE

*Zitter, Meyer, "Federal-State Cooperative Program for Local Population Estimates", Current Population Reports, Series P-26, No. 21, April 1973, United States Government Printing Office, Washington D.C. 1973 P. 45.

ALASKA CENSUS DATA NETWORK

Barbara Baker, Alaska Department of Labor

The State of Alaska has joined 41 other states and Washington D.C. in developing a census network that will provide greater accessibility to the Bureau of Census' statistical products. Based upon a voluntary agreement between the State and the Census Bureau, this program will provide a comprehensive approach in assisting the census data user. The major objectives of the Census Data Network are:

- to offer technical assistance in the use of census materials
- improve access to and extend use of the Census Bureau's statistical resources
- to moderate costs to data users, particularly in obtaining computerized data
- evaluate quality of census data

Products and Services

Census users can obtain data from the Census of Population and Housing and a broad range of other Bureau statistical programs such as the economic censuses and the Current Population Survey. Maps from the 1980 census and selected data from the Bureau of Economic Analysis and the Bureau of Labor Statistics will also be available. This data will be produced in a variety of forms including printed reports, microfiche, computer printouts, machine-readable data files and computer programs. Information on population estimates, population projections, census geography, and processing machine readable data can also be obtained from the Network.

Organization

The Network involves the coordination and participation of six state agencies. The Department of Labor was designated the coordinator of the program, while the Department of Community and Regional Affairs, University of Alaska and the Alaska State Library will serve as the other major cooperating agencies (the divisions of Budget and Management and Policy Development and Planning will maintain a policy making role from the Governors' Office). While each of the cooperating agencies will offer a broad range of services to census data users, the focus of each will be somewhat unique.

The Department of Labor has the major responsibility for coordinating the Network and maintaining contact with the Bureau of Census. It will assist data users by acting as a clearinghouse for requests and delegating responsibility to the most appropriate component of the Network. The Department will also serve as the major source of demographic information and technical assistance for other state agencies and the Alaska Legislature. Training programs will also be coordinated out of this department for Network staff and data users.

The Department of Labor will maintain a comprehensive collection of census publications that will be open to the public. In addition, a telephone information service is available during normal business hours. The phone number is (907) 465-4513 or 465-2784.

The Department of Community and Regional Affairs (C&RA) will service the data needs of local governments in the State. C&RA will also maintain a collection of census publications that generally focus upon state and local

areas. The Department will disseminate census products as well as provide technical assistance to its users.

The University of Alaska's Institute for Social and Economic Research (ISER) will be the depository for computer tapes from the Census Bureau. ISER's primary activity is to process data requests from machine readable files for the academic and private sector (the Department of Labor is responsible for state government generated requests).

The Institute will also offer computer tape copying, technical assistance, data analysis and consultation on the use and limitation of census data. Some of these services may be on a cost reimbursable basis. To contact ISER, write to ISER University of Alaska, 707 "A" Street, Anchorage, Alaska 99501 or call (907) 278-4621.

The Alaska State Library will continue its role of disseminating information to the general public. As a federal documents depository library, it contains one of the most complete collections of Census publications for Alaska and the U.S. The Library offers some technical assistance in locating and interpreting census data and they will refer users to other agencies in the network when requests or technical assistance reaches beyond their capability. To contact the Library, call (907) 465-2942.

New users of census data should contact the Alaska State Library or the Department of Labor at this time. In May, however, an affiliate network will be available to respond to user requests for information from published census reports. Affiliates will maintain a basic library of census documents that pertain to Alaska. They will be located throughout the State in established information centers such as libraries, academic institutions, and planning agencies. Locations and names of affiliates will be available in April and can be obtained from the Department of Labor. Information on affiliates will also be published in the Alaska Census Data newsletter, entitled "AK' CENS".

AVAILABILITY OF 1980 CENSUS DATA

Barbara Baker, Alaska Department of Labor

Although many reports from the 1980 Census have been released by the U.S. Census Bureau, numerous delays created from problems such as court suits and federal cutbacks have set back the schedule for releasing reports by six months to a year. Budgetary constraints have also caused the Bureau to reassess the value of many of the scheduled products. Various reports have been either eliminated or reduced to only one type of usable form (i.e. paper copy, microfiche, computer tape). Criticism from user groups has persuaded the Bureau to reinstate some of the reports but many cutbacks have remained with the thought that private enterprise will carry the cost of processing the deleted products.

Changes to the publication program include the issuance of reports in either printed form, microfiche, or computer tape; reduction of the number of race/ethnic summary records for Summary Tape File 2A and 4A to 7 groups, and deleting Summary Tape File 3B. The effect of these on Alaska had not been evaluated by the time of this printing.

A special EEO Summary tape file has been added to the products list. It will provide detailed occupation, age, and education data by sex, race, and Spanish origin for counties (census areas and boroughs in Alaska). Also, a special report will be published early in 1982 containing sample data for the Nation, States and SMSA's. This report will yield preliminary estimates for most long-form characteristics.

Table 1, "Time Schedule and Description of Selected 1980 Census Reports", outlines the content, date of release, the published form in which it will be available, and geographic coverage of popular 1980 census reports. On the left, a coded report name appears with the full name of each report. Each report is categorized by the type of population and housing data which it contains. Population data are grouped into four categories: (1) simple counts, (2) items from the short census form (e.g., age, race, sex, and marital status), (3) items from the long census form (e.g., nativity, language, and veteran status) and (4) cross tabulations from both long and short form items (e.g., family income by type of occupation by race and sex, and educational characteristics by race). Housing items are presented in a similar fashion. Three housing data subdivisions are presented (1) simple counts, (2) short form items (e.g., plumbing, and number of rooms), (3) long-form items (e.g., building

type, water source, and heating fuel). Geographic coverage is divided into 8 categories: statewide; 23 census areas; 24 census sub areas; Anchorage Standard Metropolitan Statistical Area; selected municipalities; incorporated places; unincorporated places; and villages and reservations.

The "PHC" series will issue data on population and housing unit counts. PHC 80-V was released and information from it is reproduced in Section II. A revision to the total population and housing count was issued following the release of this report and the new totals are footnoted in the appropriate table in Section II.

Population counts and characteristics will be covered in the "PC" series. Final official population counts (PC 801-A) have been released and are provided in Section II. Other reports in this series include statistics on characteristics collected on all persons for most geographic levels, and social and economic characteristics collected from a sample of the population for selected geographic levels.

The "HC" series will present statistics on subjects for all housing for most geographic levels and detailed characteristics collected on a sample basis for selected geographic levels. Subject reports that will concentrate on particular housing data will be issued generally for only the national and regional levels. (Data including Alaska, for example, would be available only for the nation as a whole and the western region of the United States.)

The major portion of the results of the 1980 census will be provided in a set of four summary computer tape files (STF's). The first two STF's will relate to the subject items collected on a 100 percent basis in the census. STF 1 & 2 will cover characteristics of both population and housing. STF 2 will provide more detailed 100 percent data than STF-1. Summary tape files 3, 4 and 5 will relate to the subject items collected on a sample basis in the census, and will also generally include sample data on the 100 percent items for purposes of cross classification. Summary tape files may be purchased from the Bureau of the Census or computer runs can be made from the tapes through the Alaska Census Data Network (see the special report in Section IV for more detail).

Table 1
Time Schedule and Description of Selected 1980 Census Reports

REPORT NAME		Population				Housing			Geographic Coverage								Date of Release	Published Form
		Population Counts	Population items asked of all: age, race, sex, marital status, etc.	Population items from long form: nativity, language, veteran, etc.	Long form population items cross-classified with age, race, sex, etc.	Housing Counts	Housing items asked of all: plumbing, rooms ownership, etc.	Housing items from long form: building type, water/source, fuel, etc.	Statewide	23 Census Areas	24 Census Sub-areas	Anchorage	Selected Municipalities	Incorporated Places	Unincorporated Places	Villages		P-(Paper Copy) M-(Microfiche) C-(Computer Tape)
PHC 80-V	Final Population & Housing Unit Counts	X				X			X	X	X	X	X	X	X	X	At†	P
PHC 80-1	Block Statistics 1/	X	X				X					X	X				4/82	M
PHC 80-2	Census Tracts 2/	X	X				X					X	X				6/82-1/83	P
PHC 80-3	Summary Characteristics for Governmental Units 3/	X	X	X		X	X	X	X			X	X	X		X	5/82-9/82	M
PC 80 1-A	Number of Inhabitants	X							X	X	X	X	X	X	X	X	At†	P
PC 80 1-B	General Population Characteristics	X	X						X	X	X	X	X	X		X	'82	P
PC 80 1-C	General Social & Economic Statistics	X		X					X	X	X	X	X			X	6/82-12/82	P
PC 80 1-D	Detailed Population Characteristics	X		X	X				X			X					1/83-9/83	M
PC 80-2	Volume II Subject Report	X	X	X	X				X			X	X			X	1982	P
HC 80 1-A	General Housing Characteristics					X	X		X	X	X	X	X	X		X	3/82	P
HC 80 1-B	Detailed Housing Characteristics					X		X	X	X		X	X			X	6/82-12/82	P
Summary Tape Files 1A & B		X	X			X	X		X	X	X	X	X	X	X	X	At†	C

† Currently available.
1/ Block Statistics for Anchorage, Fairbanks (and North Pole), Cordova, Juneau; also included racial data.
2/ Tract statistics for Anchorage, Fairbanks.
3/ Also includes data for the 23 Census Areas.

MUNICIPAL CENSUS RESULTS AND COSTS FOR 1981

David A. Swanson, Alaska Department of Labor

Introduction

In 1981, six cities with a population exceeding 1,000 conducted a special census that was certified for state revenue-sharing and other programs.1/ Each census was conducted because of a belief by city officials that either the U.S. Bureau of the Census missed a substantial number of people in the 1980 decennial census or the city's population increased significantly subsequent to the 1980 census.

The state-assisted census program, initiated in 1981, is designed to be a component of the state's annual municipal population determination program, which was extensively revised in 1981. Each city with a population over 1,000 now has the choice of: (1) preparing (or having prepared on its behalf) a population estimate using a standard methodology that is reviewed by the state; or (2) conducting a census under state guidelines that use standards and definitions in accordance with those used by the U.S. Bureau of the Census. By utilizing the federal standards and definitions, each census certified by the state will be accepted by the U.S. Bureau of the Census for its annual population determination program, which is used to distribute federal funding.

An important difference between the federal decennial census and those certified by the state is in the number of questions. In the 1980 federal decennial census, 19 questions were asked of every household and, on a sample basis, 55 additional questions were asked of every household included in the sample. In the state's census program, a simple "headcount" is conducted and the only questions asked are those used to determine residency.2/

In this report, census results for each of the six cities conducting a special 1981 Census, Cordova, Fairbanks, Nome, Petersburg, Unalaska, and Wrangell, are displayed in the following section. In the final section, census costs for the six cities are presented along with statistics and guidelines that can be used by city officials considering a census.

Census Results

Tables 1 through 6 show the basic population and housing unit data for the six cities. Each city shows a gain in population over the 1980 federal census, ranging from 161 persons for Wrangell to 2,923 for Fairbanks. These gains reflect: (1) actual population increases occurring subsequent to the federal census; (2) under-counts in the federal census; and (3) a seasonality factor—the federal census was conducted in late winter and early spring of 1980 while the state-certified ones were conducted in either the summer or fall of 1981.

In table 7, comparisons are made between 1980 and 1981 census results. Each city shows an increase not only in population but also in number of households and the number of housing units. In line with national and state trends, declines in the average number of persons per household are shown for each city except Unalaska, which was also the only city to show an increase in the percent of vacant housing units.

The single most important factor contributing to the population gains observed for each city is probably the increased number of households found for each city in 1981. The increase in households is itself attributed primarily to two factors: (1) seasonality; and (2) procedures used in the state-assisted censuses that encouraged efforts to identify people residing in households. This second factor, improved identification of household residents, is partly due to federal census procedures and payment policies that encouraged federal enumerators to declare a house as vacant rather than taking the additional time needed to locate household residents. The State-assisted censuses, on the other hand, used procedures and payment policies that encouraged census workers to locate all residents. Note, for example, the dramatic declines in vacancy rates found in Fairbanks and Nome: from 16.15% to 7.40% in Fairbanks; and from 22.64% to 9.69% in Nome.

Census Costs

The cost of conducting a state-assisted census is determined primarily by the wage scale and person-hours worked. Total person-hours are determined by the total number of households to be enumerated, average household size, the number of people in group quarters, and the "callback rate."3/ Two other factors, generally unmeasurable, affecting the cost of a census are the average time spent going between households and the average time spent at each household.

Table 8 shows, by city, the "unit dollar cost" of each census by three indices: households; housing units; and persons. Note some of the differences shown in Table 8. Unalaska, for example, shows a high dollar cost by both household and housing unit. However, when Unalaska's cost is indexed to persons-counted, the unit cost is in line with that found for the other cities. In Unalaska's case, the high cost per household and per housing unit is caused by the presence of a large "group quarters" population—people residing in bunkhouses, dormitories, and commercial vessels.

In order to control for variation in wage scale, Table 9 shows the "number" of "items" enumerated per person-hour, where "item" refers to the same three indices used in Table 8. The differences between cities shown here are, as was discussed in the first part of this section, determined by average household size, group quarters population, and the callback rate. Of these three items, the callback rate is usually the most critical. The lowest callback rate for the six cities was in Unalaska, where 24.2% of all housing units had nobody present at the initial contact. The highest rate was in Fairbanks, which had 37.4%. The remaining four cities, Cordova, Nome, Petersburg, and Wrangell had callback rates of 29.7%, 31.9%, 35.7%, and 36.5%, respectively.

In order to estimate the cost of conducting a census, the first step is to estimate the total number of person-hours needed. Once the total person-hours are estimated, an average wage can be multiplied by the total person hours and added to additional costs such as supplies, mileage, and postage. (Note that all costs, not just wages, are included in the costs given in Table 8). In any census the major item of cost will, however, be wages for the census staff.

To estimate total person-hours, three items are needed: an initial estimate of the total number of housing units; Group Quarters population; and the expected callback rate. As an example, suppose that City "A" is assumed to have 1,500 housing units, 100 people living in Group Quarters, and an expected callback rate of 35%. Note that the example callback rate and example Group Quarters population are both very close to those found in Petersburg. Consequently, Petersburg's average number of housing units counted per person-hour of 3.45 may be appropriate to use. By dividing the estimated 1,500 housing units in City "A" by 3.45, the estimated number of 435 person-hours needed for a census of City "A" is found. A similar approach may be used for any city with an estimated population between 1,000 and 25,000.

The most difficult item to estimate is usually the callback rate. Unlike the total number of housing units and the group quarters population, both of which can be benchmarked from the 1980 census, the callback rate from the 1980 census is not reported. It is crucial that the person responsible for estimating the cost of a census have a good knowledge of the city's population. For example: the number of households with two adults, both of whom work; the number of single-person households; and standard working days (if people in town tend to work between 8:00 A.M. and 4:30 P.M., it makes sense to have enumerators working after 4:30 P.M.). Each of these factors contributes to an estimate of the callback rate.

In this report, the guidelines presented for estimating census costs refer only to cities or other places where the population resides in housing units that are relatively close together and accessible by foot or car. For remote areas where the population is widely scattered and not accessible by foot or car, the costs will be significantly higher.

Footnotes

1. A special census was conducted in the entire North Slope Borough, excluding the city of Barrow. The largest portion of work was done at the Prudhoe Bay site, which has unique characteristics that preclude any comparisons with municipal census. The North Slope Borough census characteristics will be the subject of a special report, planned for release in June, 1982.

2. "Census residency" is a definition that has no specific relation to concepts of residency for voting, game licences, or permanent fund distributions. The definition of a "resident" for census purposes is based on where a person eats and sleeps. It is defined in detail in **Alaska Census Enumerator's Manual**, Department of Labor, State of Alaska.

3. "Callback" refers to a housing unit in which nobody was present when a census enumerator first came by, which necessitates one or more return calls to determine if the unit is occupied, and if it is, how many people reside there.

Table 1
Cordova

Units Per Structure	Total Housing Units	Vacant Housing Units	Households	Population	Average Persons Per Unit	Vacancy Rate (in Percent)
1 Unit	349	16	333	967	2.90	4.58
2 Units	62	5	57	154	2.70	8.06
3 Units	32	1	31	76	2.45	3.13
4 Units	36	3	33	84	2.61	8.33
5 or more	170	9	161	331	2.06	5.29
Mobile Homes	173	10	163	443	2.72	5.78
Trailers	32	2	30	58	1.93	6.25
All Structures Combined	854	46	808	2114	2.62	5.39

Group Quarters Population
109

TOTAL POPULATION
2,223

Table 2
Fairbanks

Units Per Structure	Total Housing Units	Vacant Housing Units	Households	Population	Average Persons Per Unit	Vacancy Rate (in Percent)
1 Unit	3414	289	3185	9281	2.93	7.29
2 Units	1180	71	1109	2719	2.45	6.02
3 Units	264	18	246	900	2.83	6.82
4 Units	368	30	338	813	2.41	8.15
5 or more	4515	340	4175	10014	2.40	7.53
Mobile Homes	47	11	36	110	3.06	23.40
Trailers	65	10	55	127	2.31	15.38
All Structures Combined	9853	729	9124	23564	2.58	7.40

Group Quarters Population
2004

TOTAL POPULATION
25568

Table 3
Nome*

Units Per Structure	Total Housing Units	Vacant Housing Units	Households	Population	Average Persons Per Unit	Vacancy Rate (in Percent)
1 Unit	683	70	613	2163	3.53	10.25
2 Units	90	8	82	210	2.56	8.89
3 Units	30	3	27	60	2.22	10.00
4 Units	60	3	57	155	2.72	5.00
5 or more	117	11	106	268	2.53	9.40
Mobile Homes	37	2	35	93	2.66	5.41
Trailers	5	2	3	7	2.33	40.00
All Structures Combined	1022	99	963	2956	3.20	9.69

Group Quarters Population
83

TOTAL POPULATION
3039

*1901 Boundaries

Table 4
Petersburg

Units Per Structure	Total Housing Units	Vacant Housing Units	Households	Population	Average Persons Per Unit	Vacancy Rate (in Percent)
1 Unit	609	27	582	1,770	3.04	4.43
2 Units	100	12	88	232	2.64	12.00
3 Units	24	2	22	39	1.77	8.33
4 Units	20	0	20	40	2.00	0.00
5 or more	54	0	54	190	3.52	0.00
Mobile Homes	226	2	224	540	2.41	0.88
Trailers	25	2	23	41	1.78	8.00
Boats	46	0	46	66	1.44	0.00
All Structures Combined	1104	45	1059	2918	2.76	4.08

Group Quarters Population
83

TOTAL POPULATION
3,001

Table 5
Unalaska

Units Per Structure	Total Housing Units	Vacant Housing Units	Households	Population	Average Persons Per Unit	Vacancy Rate (in Percent)
1 Unit	245	34	211	538	2.55	13.88
2 Units	102	7	95	246	2.59	6.86
3 Units	3	1	2	2	1.00	33.33
4 Units	16	0	16	27	1.69	0.00
5 or more	36	0	36	68	1.89	0.00
Mobile Homes	67	6	61	173	2.84	8.96
Trailers	0	0	0	0	0	0.00
All Structures Combined	469	48	421	1054	2.50	10.23

Group Quarters Population
890

TOTAL POPULATION
1944

Table 6
Wrangell

Units Per Structure	Total Housing Units	Vacant Housing Units	Households	Population	Average Persons Per Unit	Vacancy Rate (in Percent)
1 Unit	514	32	482	1392	2.89	6.23
2 Units	32	3	29	67	2.31	9.38
3 Units	25	0	25	49	1.96	0.00
4 Units	30	3	27	90	3.33	10.00
5 or more	77	8	69	194	2.81	10.39
Mobile Homes	152	8	144	434	3.01	5.26
Trailers	13	4	9	13	1.44	30.77
Boats	42	0	42	82	1.95	0.00
All Structures Combined	885	58	827	2321	2.81	6.55

Group Quarters Population
24

TOTAL POPULATION
2345

Table 7
Summary Comparisons, By City Between Federal Census Results in 1980 and State-Assisted Census Results in 1981

City	Population 1980	Population 1981	Difference	Housing Units 1980	Housing Units 1981	Difference	Vacancy Rate (in Percent) 1980	Vacancy Rate (in Percent) 1981	Difference	Average No. Of Persons Per Housing Unit 1980	Average No. Of Persons Per Housing Unit 1981	Difference
Cordova	1879	2223	344	728	854	126	9.75	5.39	-4.36	2.67	2.62	-.05
Fairbanks	22645	25568	2923	9714	9853	139	16.15	7.40	-8.75	2.60	2.58	-.02
Nome *	2301	3039	738	901	1022	121	22.64	9.69	-12.95	3.24	3.20	-.04
Petersburg	2821	3001	180	1074	1104	30	8.85	4.08	-4.77	2.84	2.76	-.08
Unalaska	1322	1944	622	323	469	146	5.88	10.23	+4.35	2.38	2.50	+.12
Wrangell	2184	2345	161	835	885	50	9.22	6.55	-2.67	2.82	2.81	-.01
All Cities	33152	38120	4968	13575	14187	612	14.99	7.22	-7.77	2.67	2.65	-.02

* The 1980 federal census defined the boundaries of Nome to be those established in 1905. The 1981 census certified by the State shows the results for Nome according to the boundaries established in 1901.

Table 8
Unit Dollar Costs of State-Assisted Censuses in 1981, By City

City	Dollar Cost Per: Person Counted	Household Counted	Housing Unit Counted
Cordova	2.25	6.19	5.85
Fairbanks	1.92	5.39	5.00
Nome	2.01	6.61	5.97
Petersburg	1.10	3.14	3.01
Unalaska	2.57	11.88	10.66
Wrangell *	N/A	N/A	N/A
Average Cost (Unweighted)	1.97	6.64	6.10
Standard Deviation	0.55	3.22	2.81

*Wrangell's costs are excluded because the census was done under the direction of the State Demographer, who was on-site over the entire census. Wrangell was the first city to request a census and it was used to field test the procedures designed for the new census program.

Table 9
Number of Persons, Households and Housing Units Counted Per Person-Hour For State-Assisted Censuses in 1981, By City

City	Number Enumerated Per Person Hour: Persons	Households	Housing Units
Cordova	8.35	3.03	3.21
Fairbanks	7.14	2.55	2.75
Nome	8.68	2.64	2.92
Petersburg	9.39	3.31	3.45
Unalaska	12.26	2.65	2.95
Wrangell	6.59	2.32	2.49
Average (Unweighted)	8.74	2.75	2.96
Standard Deviation	2.01	0.36	0.34

STATE POPULATION ESTIMATES FOR ALASKA DURING THE 1970's

David Swanson, Alaska Department of Labor

This report provides a series of revised state population estimates for the period 1971-1979 and components of the changes in population between 1970 and 1980. This information, as of an April 1st date for each year, is found in Table 1.

For purposes of comparison, Table 2 displays the annual state population estimates found in Table 1 along with another set of estimates produced by the U.S. Bureau of the Census.

Inspection of the different sets of figures will show general agreement in the early and latter portions of the decade. However, divergence is apparent beginning in 1975, which coincides with the initial phases of population growth associated with the oil pipeline. The Department of Labor estimates show a rapid increase culminating in 413,100 people in 1977, and a subsequent period of decline stabilizing at about 400,000 persons by 1979.

The estimates provided by the U.S. Bureau of the Census exhibit a period of rapid growth between 1974 and 1976 and slowed growth between 1978 and 1979. In 1979, the inter-censal population is estimated to peak at 402,000 persons. A slight decline is shown between 1979 and 1980.

Primarily, the differences in these two sets of estimates can be attributed to slightly different sets of assumed migration patterns. The Department of Labor estimates, and to a lesser extent, the Census Bureau series, assume a "boom-bust" pattern of migration. However, the pattern assumed by the Department of Labor, as shown in Table 1, contains high levels in the net number of in-and-out-migrants associated with the pipeline construction cycle and a more rapid response of migration to its "boom" and "bust" phases.

Table 1
Annual Population Estimated For Alaska, 1970-1980, With Components of Change

April 1 to April 1	Population at end of period*	COMPONENTS OF CHANGE[1]					
		Natural Increase	NET MIGRANTS				
			Total	Military	Civilian		
					Total	Under 18 yrs.	18 years and over
1969-70	302,580**	---	---	---	---	---	---
1970-71	311,200	6,120	2,500	900	1,600	---	---
1971-72	320,000	5,850	2,950	-3,770	6,720	1,320	5,400
1972-73	330,000	5,480	4,520	-1,520	6,040	650	5,390
1973-74	344,000	5,140	8,860	-260	9,120	-990	10,110
1974-75	383,100	5,600	33,500	-850	34,350	1,690	32,660
1975-76	410,700	5,920	21,680	560	21,120	4,000	17,120
1976-77	413,100	6,300	-3,900	-2,480	-1,420	-100	-1,320
1977-78	403,100	6,750	-16,750	820	-17,570	-100	-17,470
1978-79	400,600	7,170	-9,670	280	-9,950	-1,250	-8,700
1979-80	401,850***	7,500	-6,250	-690	-5,560	-2,760	-2,800

Prepared by: State Demographer, Research and Analysis, Department of Labor, Juneau, Alaska, December, 1981.

*The figures are for the resident population in accordance with definintions used by the Bureau of the Census.

**The final corrected 1970 census total is 302,583. In the table this has been rounded.

***The corrected 1980 census count is 401,851. In the table this figure has been rounded.

1 The "Natural Increase" figures, which are derived by subtracting resident deaths from births tc the resident population, are taken from data supplied by Vital Statistic, Department of Health and Social Services; the net migration figures are derived from school enrollment, employment, military manpower, and census reports.

Table 2
Comparison of Revised Series of 1970-1980 Population Figures Produced By The Department of Labor and the Bureau of the Census

	Alaska Department of Labor	U.S. Bureau of the Census[1]
1970	302,580	303,000
1971	311,200	316,000
1972	320,000	326,000
1973	330,000	333,000
1974	344,000	344,000
1975	383,100	370,000
1976	410,700	392,000
1977	413,100	396,000
1978	403,100	401,000
1979	400,600	402,000
1980	401,850	400,000

1 These figures are taken from "Preliminary State Intercensal Estimates", released 24 June 1981 by the Chief, Local Area Population Estimates, U.S. Bureau of the Census. Note that the date of estimation for each year 1971-1979 is July 1st; for 1970 and 1980, the final census figures (rounded to the nearest 1,000) are as of April 1st.

CHANGES IN AVERAGE HOUSEHOLD SIZE: 1970-1980

David Swanson, Alaska Department of Labor

The average number of persons per household is one of the four critical variables used in the "Housing Unit Method" of population estimation.1/ This method is the preferred technique for estimating population in Alaska's large cities (those which have a population exceeding 1,000) while for Boroughs, the Housing Unit method was one of several techniques available for developing the official 1981 population determinations.

For Alaska, the decline in average household size between 1970 and 1980 mirrored the national decline. The 1980 census confirmed that average household size fell below three persons both nationally and in Alaska: from 3.11 in 1970 to 2.75 in 1980 and from 3.52 to 2.93, respectively. The 16.73 percent decline for Alaska is the highest rate of decline among the fifty states. The lowest rate of decline was found in Utah, only 7.5 percent.

Of the nineteen major cities in Alaska, which are shown in Table 1, Barrow exhibited the greatest decline in average household size, 35.6 percent. The least amount of decline was found in Cordova, only 6.1 percent.

Table 2 shows the declines found for the state's boroughs between 1970 and 1980. Here the greatest decline was posted in the North Slope Borough (-29.6 percent) while the lowest decline found is for Sitka (only -7.9 percent).

In terms of social and demographic conditions, four factors are responsible for the decline in average household size: more people living alone before marriage; increased marital dissolutions, resulting in more people living alone following a dissolution; people having fewer children; and more elderly women who outlive their husbands. These social and demographic trends have, along with economic conditions, contributed to a changing mix of housing stock: from a predominance of single-unit dwellings to multiple-unit dwellings, which have fewer persons per household.

The potential for further state and national declines in average household size is great. As large numbers of young adults leave parental households, marry late in life, have few children, and divorce at high rates, declines will continue. For Alaska, an additional factor will be the tendency for single, young and childless people to move into the state.

Footnote

1. The Housing Unit Method is described in detail in "The Housing Unit Method of Population Estimation: A Manual For Municipal Personnel Responsible For Annual Population Estimates", which is available from the State Demographer, Alaska Department of Labor.

Table 1
Changes in Household Size For Major Cities in Alaska

	1970	1980	Percent Change
Barrow	5.64	3.63	-35.64
Bethel	4.43	3.26	-26.41
Cordova	2.94	2.76	-6.12
Dillingham	3.80	3.35	-11.84
Fairbanks	2.97	2.60	-12.46
Homer	3.27	2.66	-18.65
Kenai	3.63	2.87	-20.94
Ketchikan	3.18	2.66	-16.35
Kodiak	3.26	2.97	-8.90
Kotzebue	4.76	3.62	-23.95
Nome	3.92	3.24	-17.35
Palmer	3.25	2.82	-13.23
Petersburg	3.27	2.84	-13.15
Seward	3.06	2.50	-18.30
Soldotna	3.40	2.87	-15.59
Unalaska	3.20	2.38	-25.63
Valdez	3.19	2.88	-9.72
Wasilla	3.40	3.07	-9.71
Wrangell	3.31	2.82	-14.80
State	3.52	2.93	-16.76

Table 2
Changes in Household Size for Boroughs in Alaska

	1970	1980	Percent Change
Municpality of Anchorage	3.07	2.80	-8.79
Bristol Bay Borough	3.83	3.07	-19.84
Fairbanks-North Star Borough	3.37	2.78	-17.51
Haines Borough	3.46	2.93	-15.32
City and Borough of Juneau	3.16	2.74	-13.29.
Kenai Peninsula Borough	3.56*	2.92	-17.98
Ketchikan Gateway Borough	3.26	2.76	-15.34
Kodiak Island Borough	3.54	3.06	-13.56
Matanuska-Susitna Borough	3.40	3.06	-10.00
North Slope Borough	5.55**	3.91	-29.55
City and Borough of Sitka	3.31	3.05	-7.85

* 1970 value for Kenai-Cook Inlet Census Division
** 1970 is for Barrow Census Division

IV.B Technical Reports

1981 POPULATION DETERMINATIONS: TECHNICAL DOCUMENTATION

David Swanson, Alaska Department of Labor

Because of the wide applicability of population data and the potential for rapid changes in Alaska, annual figures are important. The two general procedures for developing population information are either a census or an estimation technique. Since a complete census costs more than an estimate, most population determinations are developed through estimation.

The first step in developing a set of 1981 comprehensive population determinations for Alaska was an estimate of the state's total population. This figure was then used as a total to which the population estimates of the twenty-three Census Areas were controlled. There are two basic reasons for this approach which is, incidently, used not only in Alaska but also by demographic centers in every other state and by the U.S. Bureau of the Census. The first reason is that, in general, it has been found that a higher degree of accuracy is achieved using this approach than would be found by developing independent estimates for a state's sub-areas and adding them together to obtain a state total. Second, one of the most consistently accurate methods of population estimation, the ratio-correlation form of multiple regression, requires an independently developed state total population.

The official state total population for July 1, 1981 was estimated using a series of separate techniques designed to capture the components of population change between the date of the last federal census, April 1st, 1980 and the state's official date of July 1st for 1981. The three components of population change are births, deaths, and the net number of migrants. An important factor affecting the net number of migrants is seasonality—Alaska's resident population is typically somewhat higher at a July 1st date than at an April 1st date. The techniques used to develop the July 1st 1981 estimate of the state's total population first brought the April 1st, 1980 census total of 401,851 forward to April 1st, 1981. The techniques used were the "Bogue-Duncan Composite Method" and a modified "Component Method II".*1/* The estimates from these two methods were then arithmetically averaged to obtain a preliminary estimate for April 1st, 1981 of 410,946.

Once the preliminary April 1st estimate was developed, an adjustment factor for "seasonality" brought the estimate forward to the July 1st date. This factor, 1.0196, was developed using 1980 and 1981 census data from the six major cities conducting a 1981 census in Alaska.*2/* Multiplying the April 1st figure of 410,946 by 1.0196 provided a preliminary July 1st, 1981 population total of 419,000. This figure was adjusted to the final figure of 422,187 to account for 1981 municipal census counts and approved locally-produced municipal estimates, which in some Census Areas indicated that the preliminary estimate was low.*3/*

Once the preliminary state total population for July 1st, 1981 was developed, estimates for the state's twenty-three Census Areas (as defined by the 1980 federal census) were generated. The primary method used was the ratio-correlation procedure (a general description of the ratio-correlation method is found in the report "Improving Accuracy In Multiple Regression Estimates of Population Using Principles From Causal Modelling," which appears toward the end of section IV.B in this issue of "Population Overview").*4/* Along with the ratio-correlation method, a modified version of Component Method II and the Bogue-Duncan Composite Method were used to develop a set of July 1st, 1981 figures. Using the numbers generated by these techniques, a set of weighted averages was produced. Applied to this set were two additional sets of figures available through locally-produced, approved estimates and census counts. In the Census Areas where a significant proportion of the population was actually counted in an approved census, the Census Area total was "floated" upward if the initial figure was too low relative to the 1981 Census counts. This adjustment was considered only in four Census Areas: Fairbanks-North Star; Nome; Wade Hampton; and Wrangell-Petersburg. The other set of figures, resulting from approved estimates generated using the "Housing Unit Method," was available for three boroughs, Anchorage, Juneau, and Matanuska-Susitna.*5/* For these three Census Areas a weighted average was taken using the estimates developed locally and by the state.

The July 1st, 1981 population of each municipality in the state was determined through one of three methods: (1) a local census conducted under guidelines established by the Department of Community and Regional Affairs and the State Demographer; (2) a Housing Unit Method estimate, reviewed, and where appropriate, adjusted by the State Demographer; and (3) an allocation technique based on the share of population that a given municipality had in its census area as reported in the 1980 federal census results. The last method was used only when a municipality neither conducted a census nor provided the data needed for a Housing Unit Method estimate.

The estimates of the population aged 65 years and over by Census Area were produced as follows. The ratio of Medicare Enrollment for the state in 1979 to the population aged 65 years and over as counted in the 1980 census was found. This factor, adjusted by the trend in Medicare enrollments between 1978 and 1979, was applied to the proportion of 1979 Medicare enrollees of the 1980 total population for each Census Area. The adjusted proportion for the state as a whole was then used as a control total for July 1, 1981 to which the product of the proportion and the estimated 1981 total population for each Census Area was adjusted.

The estimates of the population by race and Census Area were developed using trends in "odds-ratios" of white to non-white population found between 1970 and 1980.*6/* The odds-ratio for each Census Area was used to determine the non-white and white population for each Census Area, which were adjusted to the estimated state control totals for each racial group.

Footnotes

1. The Bogue-Duncan Composite Method variant involved calculating the crude birth, death, and enrollment rates for 1970 and 1980, finding the rate of change, trending the rate to 1981 and dividing it into the number of events (births, deaths, or enrollment) to obtain a 1981 population estimate. The Component Method II approach takes the most recent federal census figure, to which are added reported births and deaths occurring between the date of the most recent federal census and April 1st of the current year, and the estimated net number of migrants, derived using a cohort-survival analysis of school enrollment data fall, 1980 to fall, 1981. The result of the component method estimate of population change April 1st, 1980 to April 1st, 1981 is:

1980 census total	401,851
+ Births	7,733
- Deaths	1,681
+ Net Migrants	-659
1981 estimate	409,243

2. The seasonality factor was produced using the following formula:

$$S = \frac{(P81-P80) - [(G1)(P81-P80)]}{P80}$$

Where

S = Seasonality factor to adjust an April 1st figure to July 1st

P81= Population censused circa July 1st, 1981

P80= Population censused April 1st, 1980

G1= U + G

U = estimated percent of uncaptured change/undercount using the housing unit change

$$G = \frac{H81 - H80}{H80}$$

and

H81 = housing units censused, circa July 1st, 1981

H80 = housing units censused, April 1st, 1980

This formula was applied using data from the six major cities conducting a census in 1981.

3. The census of the oil-related work sites in the North Slope Borough was also used in the adjustment of the final July 1, 1981 state population. Because the census was conducted so late in the period prescribed for 1981 population determinations, statutory deadlines made it impossible to eliminate a total state double count of approximately 0.4 percent. This double count occurred because some of the people counted as residents of Prudhoe Bay were implicitly "counted" elsewhere in the state. This double count will be eliminated when the population determinations for 1982 are made.

4. The ratio-correlation model for the state exhibited excellent characterstics. The percent of variation "explained" by the model (R2) was 93.121 and the standard error of estimate was .07407. Examination of residuals showed no trend bias, and the regression was significant at .05. F(.95;2,22)=3.49. The model itself is:

   Rp= .1167867 + (.2384505 * Rvs) + (.6090648 * Re)

   Where

   Rp = ratio of proportional population, 1980 over 1970

   Rvs= ratio of proportional vital events, 1980 over 1970

   Re= ratio of proportional enrollment, 1980 over 1970

5. The Housing Unit Method is described in detail in "The Housing Unit Method of Population Estimation: A Manual For Municipal Personnel Responsible for Annual Population Estimates," which is available from the State Demographer, Alaska Department of Labor. The weighting used was .2 for the locally-produced estimate and .8 for the state-produced estimate. The higher weight used for the state-produced estimate represents a high level of agreement among the preliminary estimates produced using the different methods. In general, a review of locally-produced estimates showed substantial variation from the cluster resulting from the state-produced estimates.

6. Unlike a proportion which is constructed using the ratio of one set of events or categories to the total sets or categories, an "odds-ratio" is constructed by taking the ratio of one set to another set. For example, suppose sets A and B have a membership of 60 and 40, respectively and represent the total sets. In taking the proportion of A, 60 is divided by 60 + 40, which results in a proportion of .6. In taking an odds-ratio of A to B, 60 is divided by 40, which results in an odds-ratio of 3 to 2 and reduces further to an odds-ratio of 1.5.

   The major advantage in using an odds-ratio over a proportion in a estimation problem that depends upon "trending" is that the odds-ratio is virtually unrestricted while a proportion is limited to a range of 0.00 to 1.00. This is an important consideration when one set of events is very rare because estimated proportions based on trends have the potential to fall below zero.

ALASKA LIFE TABLES, 1970 AND 1980

Jo Van Patten, Alaska Department of Labor

Introduction

Students of human mortality have long been aware of the systematic relationship between aging and life expectancy. This relationship is not homogeneous throughout history, across sexes, or across cultural groups. Defining the relationship has been a focus of research since the late 17th century when Halley first attempted to construct a "Life Table." The modern refinements to the study of mortality using the life table enable one to compare the mortality experience of different groups without the confounding effects of differential age distributions, fertility, and migration.

The methodology used to construct the following Alaskan Life Tables for males, females, and both sexes combined relies upon standard techniques utilized by insurance systems, pension plans, and social security. The Life Tables are shown for both 1970 and 1980 in order to examine recent changes that have occurred in mortality. Tables 1 through 3 show the mortality experience in 1970 for males, females, and both sexes combined, respectively. Tables 4 through 6 show the mortality experience in 1980 for the same populations.

Discussion

Examining Tables 3 and 6 shows that the life expectancy at birth increased from 70.56 years to 72.78 years between 1970 and 1980. This increase reflects both national and international trends found over the 1970s. In comparing male and female life expectancy at birth, one finds in 1970 females were expected to live, on the average, 9.5 years longer than males; by 1980 this difference increased to 11.3 years. These differences also reflect the increasing longevity difference found nationally for males and females. It is not only a difference that exists at birth. In 1980, a woman who has reached her 40th birthday could expect to live 43.13 years longer, while a male could expect only 33.24 additional years once he reached his 40th birthday.

In terms of reaching "working age," 95 percent of the males born in 1970 could be expected to reach their 20th birthday. By 1980 this expectation increased slightly to 96 percent. Of the males who did survive to their 20th birthday in 1970, 66 percent could be expected to reach retirement on their 65th birthday; by 1980, this expectation increased to slightly over 71 percent.

If Alaska was "closed" to migration, that is, nobody moved into or out of the state, one could expect that over 69 percent of the people born in 1970 would live to qualify for state retirement benefits granted at age 65. By 1980, this figure increased to 75 percent.

Another item of interest to be found is the decline in infant mortality shown between 1970 and 1980. In 1970, children born in Alaska had an average life expectancy of 70.56 years, while those who survived the first year of life had a life expectancy of 71.15 additional years. By 1980, the average life expectancy at birth was 72.78 years, while for those reaching their first birthday, it was 72.90 additional years. This shows that from 1970 to 1980, infant mortality declined to the point where the average life expectancy of children born increased by nearly half a year (.47).

Interpreting A Life Table: Some Simple Examples

For those who may wish to make additional comparisons, the following procedures should be used. First, the comparison of life expectancy values given for different age groups should be made in terms of birthdays. For example, in Table 3, the life expectancy value of 23.22 given for age group 55-59 refers to those people who have reached their 55th birthday. Second, in order to make statements such as "69 percent of the people born in 1970 were expected to reach their 65th birthday", use the "Number Surviving" column. For example, to find the percent of people born in 1970 expected to reach their 65th birthday, divide the figure 69,385 (given for age group 65-69 in Table 3) by the number "born" in 1970, which is 100,000, and multiply the result by 100.

Definitions

(1) Age: (x) Abridged table with 5 year groupings with the exception of the special groupings at the beginning and end of the ages.

(2) Population used to compute death rate (Mx): April 1, 1970/80 census count.

(3) Deaths: Twelve months total deaths, October 1969/1979 through September 1970/1980 as tabulated by the Alaska Bureau of Vital Records of the Department of Health and Social Services.

(4) Death Rate:

$$M_x = \frac{\text{Deaths}}{\text{Population}}$$

(5) Probability of Dying: Represents the probability of dying before reaching the next age group.

$$q_x = \frac{10\ (M_x)}{2+5(M_x)}$$

except for the first two age groups which are calculated as follows:

$$q_0 = \frac{\text{actual deaths to age group}}{\text{births}}$$

$$q_{1-4} = \frac{8\ (M_x)}{2+4(M_x)}$$

(6) Number Surviving: Out of a theoretical population (age 0) of 100,000, this many will be alive during this age interval.

$$l_x = l_{x-5} - d_{x-5}$$

(7) Number Dying: Out of a theoretical population (age 0) of 100,000, this number will die during this age interval.

$$d_x = (q_x)(l_x)$$

(8) Years Lived: Total number of person years lived during each age interval.

$$L_x = \frac{d_x}{M_x}$$

$$\text{except for } L_0 = .3\ l_0 + .7\ l_1$$

(9) Years Remaining: Total number of person years remaining.

$$T_x = \sum_{75+}^{0} L_x$$

(10) Life Expectancy: Represents the number of years of life expected after attaining age (x).

$$e_x^\circ = \frac{T_x}{l_x}$$

References

George W. Barclay, "Techniques of Population Analysis" (New York, 1958).

James A. Palmore, "Measuring Mortality: A Self-Teaching Guide to Elementary Measures," Paper No. 15, East-West Center, (Honolulu, 1971).

Table 1
Abridged Life Table
Males, Alaska
April 1, 1970

Age	Death Rate	Probability Of Dying	Number Surviving	Number Dying	Years Lived	Years Remaining	Life Expectancy
x	$_nM_x$	$_nq_x$	l_x	$_nd_x$	$_nL_x$	T_x	e^o_x
Under 1 Yr.	.024754	.023974	100.000	2.397	98.399	6.997.573	69.93
1-4	.001471	.005867	97.613	573	390.031	6.594.244	67.55
5-9	.000803	.003450	97.040	335	484.948	6.204.713	63.94
10-14	.000613	.002562	96.704	248	483.431	5.719.765	59.16
15-19	.002850	.014001	96.456	1.350	478.733	5.236.434	54.29
20-24	.002721	.013515	95.106	1.285	472.253	4.757.711	50.03
25-29	.003180	.015775	93.821	1.480	465.400	4.285.458	45.68
30-34	.002874	.014267	92.341	1.317	458.249	3.820.049	41.37
35-39	.003666	.018311	91.024	1.667	451.008	3.361.800	36.93
40-44	.005030	.024877	89.357	2.223	441.247	2.910.792	32.57
45-49	.009310	.046584	87.134	3.940	425.797	2.469.539	28.34
50-54	.010460	.051106	83.194	4.250	405.196	2.043.742	24.57
55-59	.016380	.078724	78.818	6.013	378.073	1.638.546	20.79
60-64	.026772	.124207	72.703	9.757	339.114	1.260.472	17.33
65-69	.044494	.200201	62.946	12.603	283.209	920.358	14.62
70-74	.043376	.195662	50.344	9.850	227.084	637.149	12.66
75 +	.098705	1.000000	40.494	40.494	410.065	410.065	10.13

Table 2
Abridged Life Table
Females, Alaska
April 1, 1970

Age	Death Rate	Probability Of Dying	Number Surviving	Number Dying	Years Lived	Years Remaining	Life Expectancy
x	$_nM_x$	$_nq_x$	l_x	$_nd_x$	$_nL_x$	T_x	e^o_x
Under 1 Yr.	.021675	.020240	100.000	2.026	99.503	7.643.637	76.44
1-4	.000738	.002940	97.973	299	391.599	7.545.254	77.01
5-9	.000557	.002781	97.688	272	488.340	7.153.655	73.23
10-14	.000239	.001194	97.414	116	485.350	6.665.325	68.42
15-19	.000954	.004750	97.298	463	485.325	6.179.990	63.52
20-24	.001293	.006439	96.835	624	482.972	5.694.644	58.81
25-29	.001114	.005555	96.211	534	479.954	5.211.672	54.17
30-34	.001057	.005271	95.677	504	476.921	4.732.318	49.45
35-39	.002283	.011350	95.173	1.080	473.052	4.255.497	44.71
40-44	.003491	.017304	94.093	1.628	466.342	3.782.436	40.20
45-49	.004658	.023027	92.465	2.129	456.956	3.316.093	35.86
50-54	.005823	.028697	90.336	2.592	445.131	2.859.128	31.66
55-59	.008722	.043679	87.744	3.765	428.374	2.413.997	27.51
60-64	.013787	.068638	83.979	5.764	406.035	1.985.623	23.63
65-69	.022508	.106536	78.401	8.353	371.145	1.579.588	20.13
70-74	.032222	.150262	70.048	10.527	331.788	1.207.443	17.24
75 +	.071575	1.000000	59.520	59.520	875.656	875.656	13.97

Table 3
Abridged Life Table
Both Sexes Combined, Alaska
April 1, 1970

Age	Death Rate	Probability Of Dying	Number Surviving	Number Dying	Years Lived	Years Remaining	Life Expectancy
x	$_nM_x$	$_nq_x$	l_x	$_nd_x$	$_nL_x$	T_x	e^o_x
Under 1 Yr.	.023248	.022098	100.000	2.207	98.455	7.055.056	70.56
1-4	.001116	.004450	97.793	435	390.135	6.957.504	71.15
5-9	.000627	.003130	97.358	305	486.443	6.567.369	67.46
10-14	.000360	.001696	97.053	164	484.211	6.080.926	62.66
15-19	.001843	.009056	96.889	857	482.244	5.596.715	57.76
20-24	.002192	.010800	96.032	1.048	477.180	5.114.471	53.31
25-29	.002208	.010884	94.886	1.048	471.707	4.637.291	48.87
30-34	.002035	.010128	93.844	950	466.801	4.165.574	44.39
35-39	.003064	.015206	92.894	1.412	460.838	3.698.973	39.82
40-44	.004553	.021531	91.482	1.970	452.561	3.238.137	35.40
45-49	.007203	.035378	89.512	3.167	439.676	2.785.576	31.12
50-54	.008385	.041054	86.345	3.546	422.666	2.345.899	27.17
55-59	.013099	.063418	82.799	5.251	400.670	1.923.233	23.22
60-64	.022232	.105252	77.548	8.163	367.339	1.522.130	19.63
65-69	.035128	.161481	69.385	11.204	316.802	1.154.791	16.64
70-74	.033604	.155381	58.181	9.040	266.287	838.089	14.37
75 +	.088570	1.000000	49.141	49.141	567.802	567.802	11.55

Table 4
Abridged Life Table
Males, Alaska
April 1, 1980

Age	Death Rate	Probability Of Dying	Number Surviving	Number Dying	Years Lived	Years Remaining	Life Expectancy
x	$_nM_x$	$_nq_x$	l_x	$_nd_x$	$_nL_x$	T_x	e^o_x
Under 1 Yr	0.15419	0.17389	100,000	1,739	99,197	6,887,108	68.87
1-4	0.01036	0.04109	98,261	4,037	392,039	6,788,072	69.08
5-9	0.00448	0.02238	97,795	2,188	488,783	6,329,358	64.71
10-14	0.00439	0.02187	97,577	2,134	487,680	5,839,944	59.85
15-19	0.02523	0.12335	97,309	12,001	483,991	5,361,264	54.98
20-24	0.03439	0.17014	85,309	14,515	470,359	4,887,804	50.95
25-29	0.02966	0.14178	84,470	11,940	469,388	4,391,466	46.49
30-34	0.02666	0.14087	80,130	11,288	452,287	3,922,017	42.11
35-39	0.03043	0.15100	91,766	13,854	455,472	3,469,750	37.70
40-44	0.04403	0.20983	80,382	16,877	440,667	3,004,278	33.24
45-49	0.05209	0.23709	69,506	16,370	405,858	2,557,611	29.66
50-54	0.06408	0.31608	53,136	16,790	421,274	2,151,740	24.68
55-59	0.10280	0.46268	37,455	17,328	350,021	1,730,467	20.62
60-64	0.24180	0.71356	20,128	14,360	263,013	1,301,446	16.87
65-69	0.39498	0.79700	5,768	11,293	201,197	937,633	13.72
70-74	0.73662	0.98997	34,076	11,711	281,109	633,636	11.17
75 +	1.19163	1.00000	44,361	44,361	375,429	375,429	8.46

Table 5
Abridged Life Table
Females, Alaska
April 1, 1980

Age	Death Rate	Probability Of Dying	Number Surviving	Number Dying	Years Lived	Years Remaining	Life Expectancy
x	$_nM_x$	$_nq_x$	l_x	$_nd_x$	$_nL_x$	T_x	e^o_x
Under 1 Yr	0.13718	0.15944	100,000	1,594	99,280	8,014,239	80.14
1-4	0.00899	0.03584	98,406	3,527	394,260	7,915,135	80.19
5-9	0.00292	0.01459	94,879	1,385	474,139	7,520,875	79.27
10-14	0.00181	0.00904	93,494	845	467,200	7,046,736	75.37
15-19	0.01098	0.05177	92,649	4,797	460,400	6,579,536	71.00
20-24	0.02013	0.09487	87,852	8,334	433,453	6,119,136	69.67
25-29	0.01680	0.07948	79,518	6,320	396,593	5,685,683	71.50
30-34	0.01008	0.04817	73,198	3,526	366,459	5,289,090	72.26
35-39	0.01474	0.07343	69,672	5,117	346,947	4,922,631	70.65
40-44	0.02049	0.10170	64,555	6,564	319,988	4,575,684	70.89
45-49	0.03403	0.16268	57,991	9,435	282,913	4,255,696	73.38
50-54	0.05473	0.25566	48,556	12,416	232,711	3,972,783	81.82
55-59	0.07340	0.34140	36,140	12,338	169,100	3,740,072	103.49
60-64	0.09954	0.44358	23,802	10,559	107,379	3,570,972	150.03
65-69	0.21810	1.00000	13,243	13,243	196,613	3,463,593	261.52
70-74	0.23567	1.00000	0	0	0	3,266,980	∞
75 +	0.61033	1.00000	0	0	0	3,266,980	∞

Table 6
Abridged Life Table
Both Sexes Combined, Alaska
April 1, 1980

Age	Death Rate	Probability Of Dying	Number Surviving	Number Dying	Years Lived	Years Remaining	Life Expectancy
x	$_nM_x$	$_nq_x$	l_x	$_nd_x$	$_nL_x$	T_x	e^o_x
Under 1 Yr	0.16100	0.18170	100,000	1,818	99,057	7,377,006	73.78
1-4	0.00980	0.03900	98,182	3,829	392,758	7,278,010	74.14
5-9	0.00371	0.01850	94,353	1,746	471,588	6,885,252	72.97
10-14	0.00321	0.01604	92,607	1,485	462,997	6,413,664	69.26
15-19	0.01880	0.09109	91,122	8,300	452,538	5,950,667	65.30
20-24	0.02418	0.11709	82,822	9,698	411,813	5,498,129	66.38
25-29	0.02016	0.09804	73,124	7,169	367,437	5,086,316	69.55
30-34	0.01640	0.07940	65,955	5,237	331,603	4,718,879	71.54
35-39	0.02309	0.11179	60,718	6,789	301,706	4,387,276	72.25
40-44	0.03209	0.15100	53,928	8,143	266,656	4,085,570	75.76
45-49	0.04662	0.21636	45,785	9,906	223,048	3,818,914	83.41
50-54	0.07137	0.32709	35,879	11,736	168,708	3,595,866	100.22
55-59	0.10041	0.44160	24,143	10,662	110,884	3,427,158	141.96
60-64	0.17040	0.68710	13,481	9,262	59,080	3,316,274	245.99
65-69	0.32997	1.00000	4,219	4,219	62,696	3,257,194	772.11
70-74	0.50014	1.00000	0	0	0	3,194,498	∞
75 +	0.97170	1.00000	0	0	0	3,194,498	∞

TECHNICAL COMPARABILITY OF THE 1980 CENSUS TO THOSE CONDUCTED IN 1960 AND 1970

Barbara Baker, Alaska Department of Labor

Contained in this section are the changes which occurred in the 1980 census as it relates to the census questionnaire, sampling methods and geography. Where appropriate, comparisons will be drawn between the two previous censuses conducted. In addition, this section will highlight the results of an evaluation of the 1980 census, that was conducted by Institute of Social and Economic Research (ISER). While the 1980 census represented the most accurate enumeration of Alaska, ISER finds that certain precautions in the use of census data should be observed.

Census Questionnaire

The 1980 census questionnaire was essentially the same as the ones used in 1960 and 1970. Many items from the former questionnaires were expanded to provide greater detail, and a small number of new questions were added to the basic questions on population and housing, thus, slighty altering the ability to compare data from the two previous censuses. Expanded items included: fluency of the english language, commuting, hours worked in the average week, and weeks looking for work. Choices within many of the questions taken from the 1970 questionnaire were also expanded. These include: raising the value of property from the 1970 ceiling of $50,000 to $200,000; raising the monthly rent from the 1970 ceiling of $300 to $500; inclusion of heat pumps as a main source of heat in living quarters; and adding boat, tent, van, etc. as a category under the description of domicile. New items in the 1980 census included questions on ancestry, current language, condominiums, and number of vans or trucks per household.

Several questions from the 1970 census were also omitted from the 1980 questionnaire. These items included information on: vocational training; birthplace of parents; ownership of convenience appliances, radio and television; ownership and occupancy of a second home; work history five years ago; and basement in domicile. A summary of the items included in 1980 census as compared to 1970 is shown in Table 1.

Sampling Methods

Sampling procedures in 1980 also changed slightly from those used in the 1960 and 1970 censuses. Population items collected on a 100 percent basis (sex, age, race, marital status, and relationships to the head of household) were similar to the two previous censuses, however, another 100 percent item was included relating to Spanish heritage (a 5 percent sample item in 1970).

Unlike the 1960 and 1970 censuses, which utilized various sample sizes for different census questions, only one set of sample questions were used for the 1980 questionnaire. Every other household (50 percent) was included in the sample in places, census areas and census sub-areas with less than 2,500 people and every sixth household (17 percent) in all other areas. The purpose of the larger sample was to provide greater and more reliable detail for use by small governmental units. A comparison of the differences in sample sizes used for each item in the censuses of 1970 and 1980 is also found in Table 1.

Census Geography

Larger concentrations of population and various changes in the qualifications of many geographic terms have expanded the actual quantity of data that will be made available from the 1980 census. Alaska has benefited from many of these changes since the focus in reporting data is toward small governmental units. Yet, this new wealth of data will have only limited use when attempting to compare it historically. Alaska has experienced numerous substate boundary changes since the beginning of statehood, making it difficult to draw comparisons at certain substate levels.

Table 1
1980 Census Items Compared to 1970

Population Items	Sample Size 1980 %	1970 %
Household relationship	100	100
Sex	100	100
"Race"	100	100
Age	100	100
Marital status	100	100
Spanish/Hispanic Origin or descent	100	5
School enrollment	21	15
Educational attainment	21	20
Place of birth	21	20
Citizenship and year of immigration	21	5
Current language	21	—
Ancestry	21	—
Place of residence 5 years ago	21	15
Activity 5 years ago	21	20
Veteran status	21	15
Disability	21	5
Children ever born	21	20
Marital history	21	5
Employment status	21	20
Hours worked last week	21	20
Place of work	21	15
Travel time to work	21	—
Mode of transportation to work	21	15
Carpooling	21	
Year last worked	21	20
Industry, occupation, class of worker	21	20
Work and weeks looking for work previous year	21	20
Income last year	21	20
Birthplace of parents	*	15
Mother tongue	*	15
Vocational training	*	5
Industry, occupation, and class of worker 5 years ago	*	5

Housing Items	Sample Size 1980 %	1970 %
Coverage questions	100	100
Access to unit	100	100
Complete plumbing facilities	100	100
Number of rooms	100	100
Tenure (whether unit is owned or rented)	100	100
Condominium	100	—
Acreage and presence of commercial establishment	100	100
Value of home	100	100
Monthly rent	100	100
Occupancy and vacancy status	100	100
Description of building	21	20
Stories, elevator in structure	21	5
Acreage and crop sales	21	20
Source of water	21	15
Sewage disposal	21	15
Year built	21	20
Year present occupant moved into house	21	15
Heating equipment	21	20
Fuels	21	5
Cost of utilities and fuels	21	20
Complete kitchen facilities	21	100
Number of bedrooms	21	5
Number of bathrooms	21	15
Telephone	21	100
Air conditioning	21	15
Number of automobiles	21	—
Number of light trucks and vans	21	—
Basement	*	100
Clothes washing machine	*	5
Clothes dryer	*	5
Dishwasher	*	5
Home and freezer	*	5
Television	*	5
Radio	*	5
Second home	*	5

* Items omitted in 1980 census.

Some of the more important changes in census geography that will affect Alaska include:

Blocks

In 1980, block data was collected for incorporated places with 10,000 or more inhabitants. The 1970 census contained block data only for urbanized areas. The expansion of block data will provide greater detail, in particular for Fairbanks, Juneau, and the Valdez-Cordova area.

Census Designated Places (CDP)

A CDP is a closely settled population center without corporate limits that has a minimum population of 25 in Alaska. In prior censuses (1950, 1960, 1970) these places were referred to as unincorporated places.

Census Subarea

In Alaska the equivalent to the county subdivision is the census subarea. These subareas were referred to as Minor Civil divisions in the 1970 census. Boundary changes have occurred since the 1970 census, thus reducing the comparability of data from preceding censuses.

Census Areas

The 1960 and 1970 censuses were carried out using different substate area schemes. The 1980 census was based upon yet another set of substate areas. These area changes reduce comparability of substate data from one census to another, however, they draw us nearer to a set of more meaningful areas which will conform more closely with political, social, and economic boundaries.

How do these three geographic area concepts of the Alaska compare? The 24 election districts established in Alaska's Constitution served as county equivalents in the 1960 census (see Exhibit 1). Five of these 24 election districts were later split yielding the 29 divisions used in the 1970 census (See Exhibit 2 & 3). In the 1980 census, the 29 census divisions of 1970 were consolidated into 23 census areas (see Exhibits 4 & 5). Of the 23 new census areas, eleven will cover original 1970 census division boundaries. Unlike the 1970 census divisions, certain 1980 census areas are divided into sub-areas (ten of the 1980 census areas are subdivided into 22 sub-areas). The 1980 census areas were established by the cooperative efforts of the U.S. Census Bureau and the Alaska Census Committee.1/ Census area boundaries were delineated on the basis of the following major points:

* Organized boroughs treated as county equivalents.
* Boundaries in the unorganized areas of the state that correspond to Native Corporation boundaries and/or Rural Education Attendance Areas.
* Selected census divisions of small geographic areas were combined to form larger census areas in order to create more meaningful statistical units.
* Previous census divisions maintained where possible.
* Sub areas established for statistical continuity.

Evaluation of the Census

The 1980 census has perhaps created the greatest controversy of any census in the past 200 years. Nationally and locally, concern was raised over the conduct of the census. Numerous lawsuits involving adjustments for any undercount, allegations of mismanagement and inappropriate census procedures were filed by states and municipalities throughout the United States. Concerned with the reaction to the 1980 census, Governor Hammond contracted with the Institute of Social and Economic Research (ISER) to document the conduct of the census and to investigate concerns about its quality in the State of Alaska.

The primary concerns raised in Alaska focused upon an undercount of households and population, refusal rates and inappropriate census procedures. The major findings of the study were that:

1) Although serious enumeration problems had occurred, the statewide total of housing units was substantially correct, with a possible 2 percent undercount of households. However, scattered areas, communities, fish processing units and lumber camps may have experienced larger undercounts. Results of special municipal censuses conducted in 1981 substantiates ISER's findings of isolated undercounts. As the article "Municipal Census Results and Costs for 1981" discusses in this

publication, certain Alaskan communities saw substantial population increases in 1981 due to improved identification of households.

2) "Employment data based on a reference week, in fact, does not describe employment conditions during a single week or even a single season."

3) "High refusal rates for selected census data jeopardizes its validity. Question areas of particular concern include income, fertility, and marriage."

4) "Much of the 1980 census data actually comes from a sampling of households. Widespread substitution of nonsampled households for sampled households apparently occurred in northern and western Alaska, thereby reducing the reliability of the data, particularly for those geographic regions."

There is no question that the 1980 census in Alaska suffered serious problems and that users of census data should be mindful of ISER's comments. It is also important to realize, however, that the census data is irreplaceable and in spite of certain problems, the 1980 census is believed to be better than all previous censuses in the state.

FOOTNOTE

1/ The 1980 Census Committee was organized in 1977 with Lee McAnerney, Commissioner, Alaska Department of Community and Regional Affairs as chairperson and included members of various interested state agencies in liaison with the Census Bureau in suggesting input, resolving problems and assisting in operations related to the 1980 census of Alaska.

Exhibit 1
1960 Alaska—Election Districts and Places of 25,000 or More

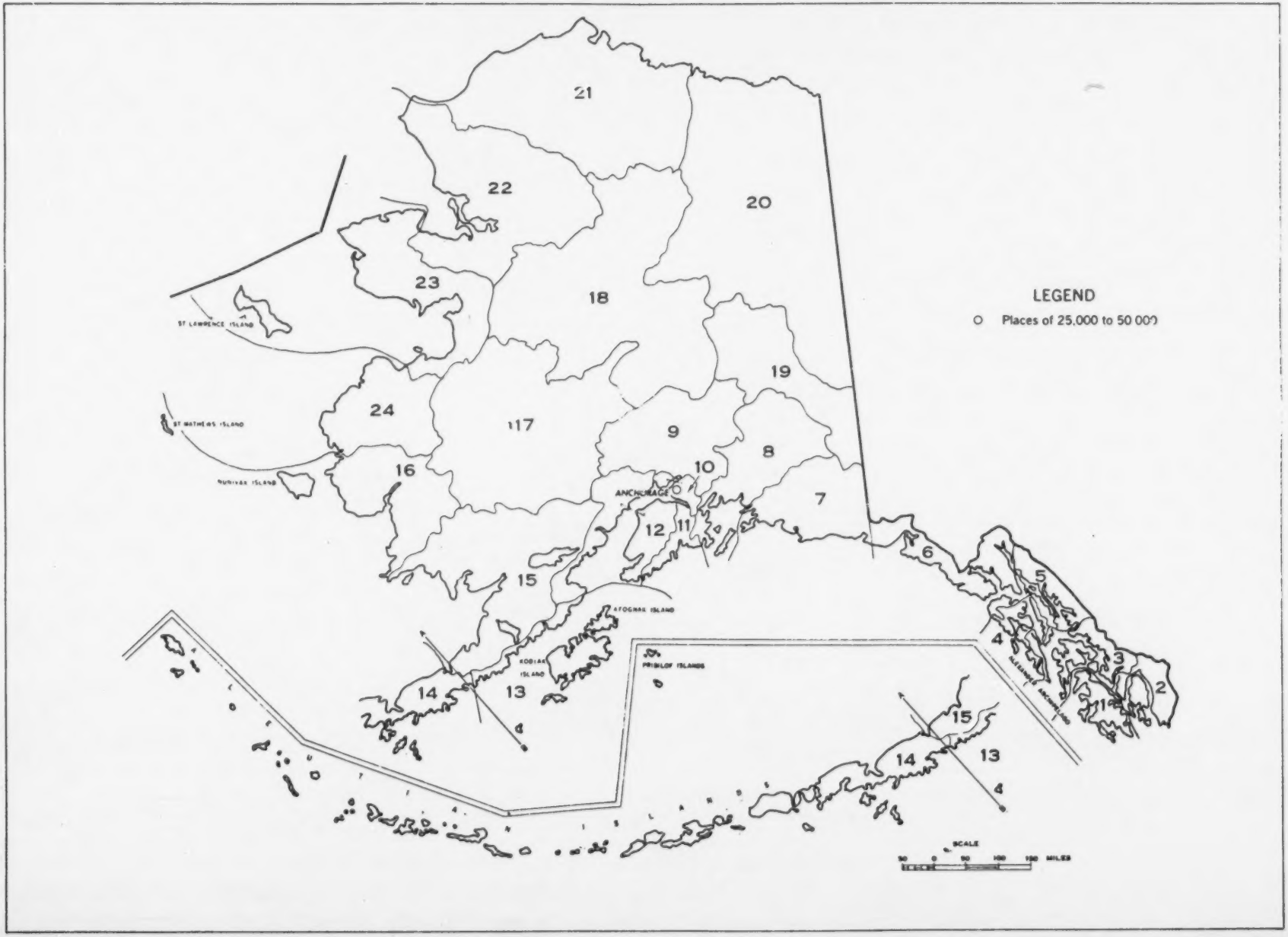


Exhibit 2
Conversion of 1960 Election Districts to 1970 Census Divisions

#	1970 Census Division	1960 Election District	#
010	Aleutian Islands Division	Aleutian Islands	14
020	Anchorage Division	Anchorage	10
030	Angoon Division	(Part of) Sitka1/	04
040	Barrow-North Slope Division	Barrow2/	24
050	Bethel Division	Bethel	16
060	Bristol Bay Borough Division	(Part of) Bristol Bay3/	15
070	Bristol Bay Division	(Part of) Bristol Bay3/	15
080	Cordova-McCarthy Division	Cordova-McCarthy	07
090	Fairbanks Division	(Part of) Fairbanks4/	19
100	Haines Division	(Part of) Lynn Canal-Icy Straits5/	06
110	Juneau	Juneau	05
120	Kenai-Cook Inlet Division	Kenai-Cook Inlet	12
130	Ketchikan Division	(Part of) Ketchikan6/	02
140	Kobuk Division	Kobuk2/	25
150	Kodiak Division	Kodiak	13
160	Kuskokwim Division	Kuskokwim	17
170	Matanuska-Susitna Division	Palmer-Wasilla-Talkeetna	09
180	Nome Division	Nome	26
190	Outer Ketchikan Division	(Part of) Ketchikan6/	02
200	Prince of Wales Division	Prince of Wales	01
210	Seward Division	Seward	11
220	Sitka Division	(Part of) Sitka1/	04
230	Skagway-Yakutat Division	(Part of) Lynn Canal-Icy Straits5/	06
240	Southeast Fairbanks Division	(Part of) Fairbanks4/	19
250	Upper Yukon Division	Upper Yukon2/	21
260	Valdez-Chitina-Whittier Division	Valdez-Chitina-Whittier	08
270	Wade Hampton Division	Wade Hampton	18
280	Wrangell-Petersburg Division	Wrangell-Petersburg	03
290	Yukon-Koyukuk Division	Yukon-Koyukuk	20

1/ Sitka Census Division + Angoon Census Division = Shift Election District.
2/ Barrow-North Slope Census Division = Barrow Election District + northern portion of Upper Yukon Election District and northwestern tip of Kobuk Election District.
3/ Bristol Bay Census Division + Bristol Bay Borough Census Division = Bristol Bay Election District.
4/ Fairbanks Census Division + Southeast Fairbanks Census Division = Fairbanks Election District.
5/ Haines Census Division + Skagway-Yakutat Census Division = Lynn Canal-Icy Straits Election District.
6/ Ketchikan Census Division + Outer Ketchikan Census Division = Ketchikan Election District.

Exhibit 3
Census Divisions and Selected Places in Alaska, 1970

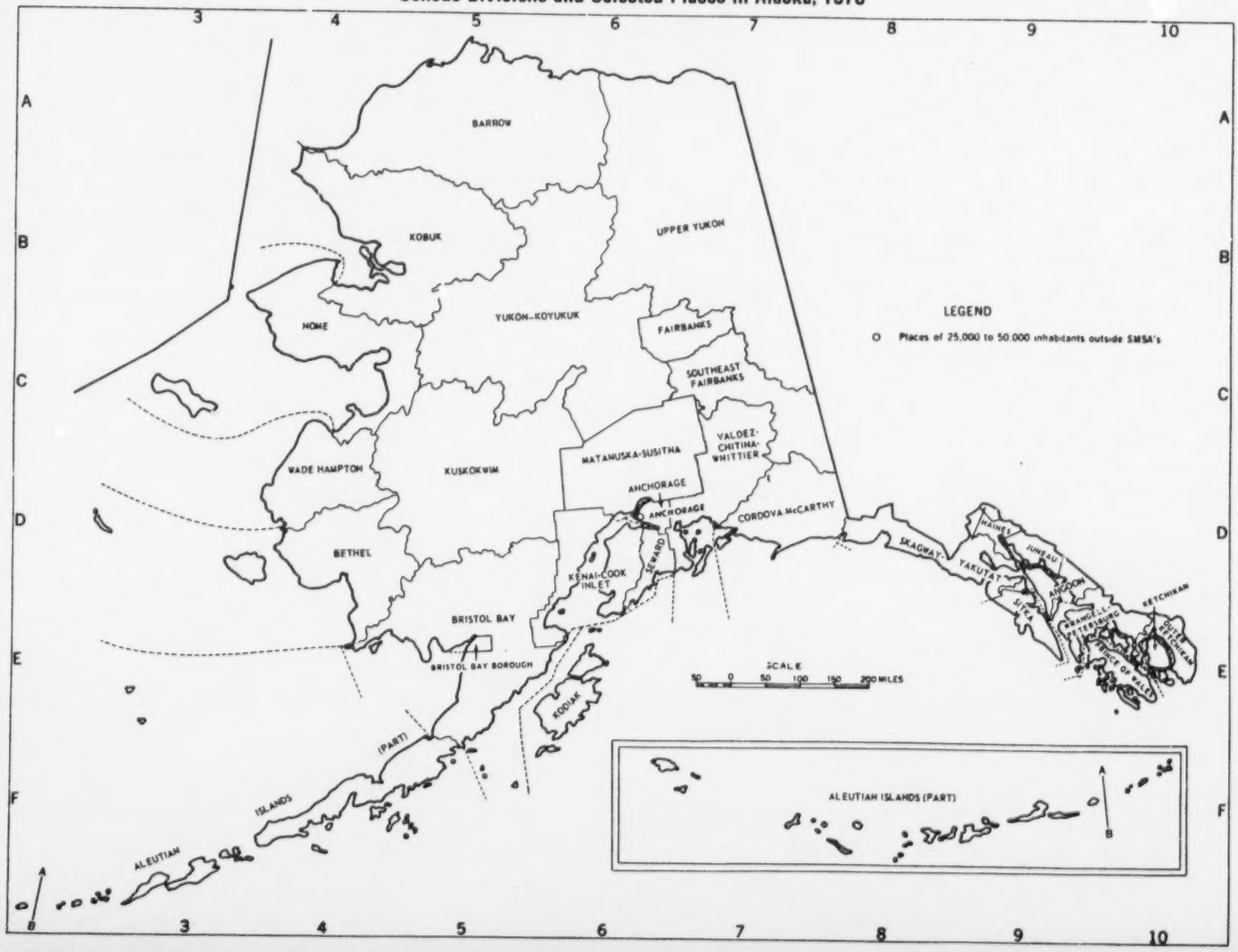
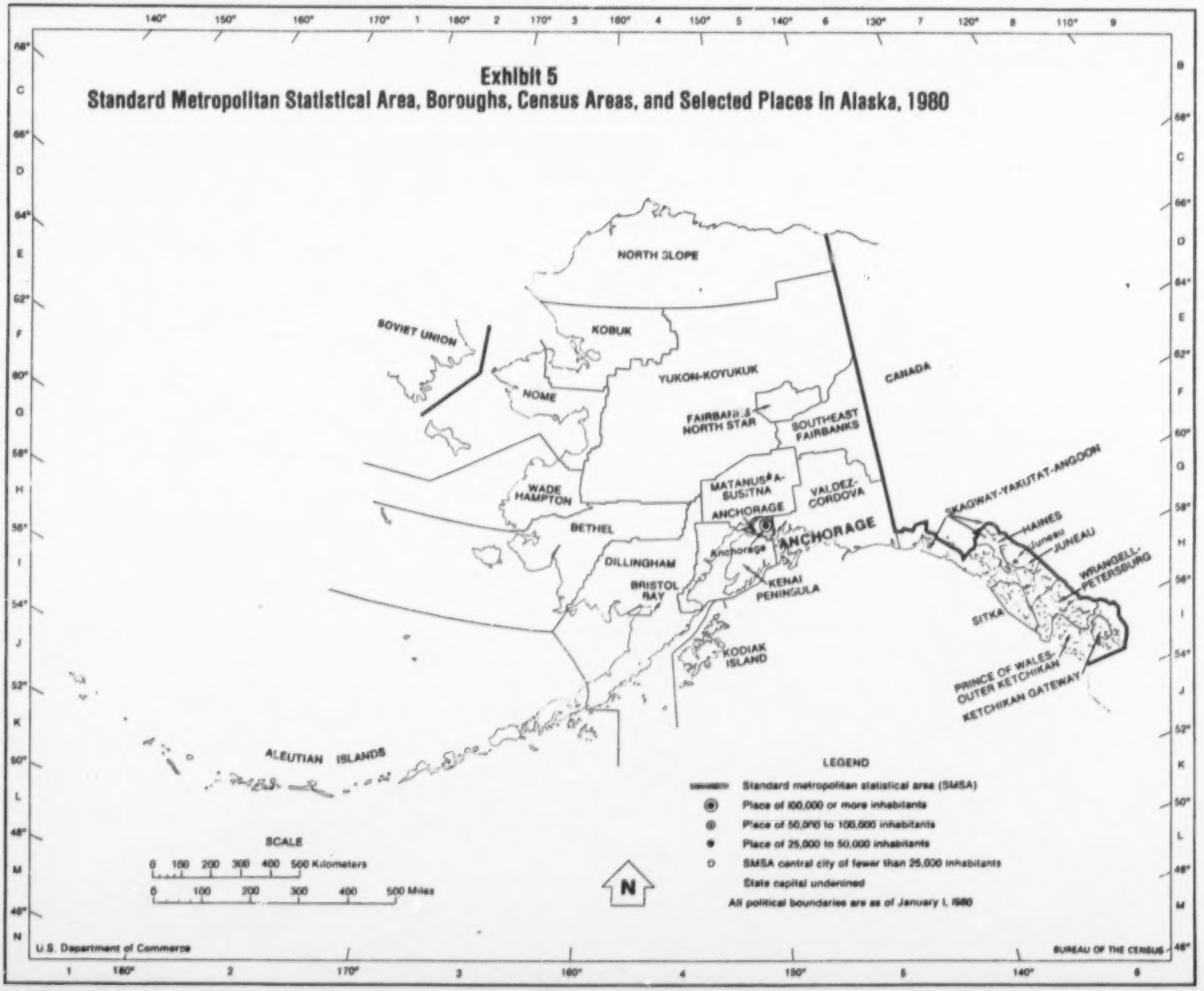


Exhibit 4
Conversion of 1970 Census Divisions to 1980 Census Areas

1980 Census Area		Component 1970 Census Divisions	
010	Aleutian Islands Area	[01]	Aleutian Islands Division (excludes area N.E. of Port Moller).
020	Anchorage Borough	[02]	Anchorage Census Division (N.C.).
		[03]	Angoon Census Division (added to Skagway-Yakutat-Angoon Area 230).
		[04]	Barrow-North Slope Census Division (renamed North Slope Borough 185).
050	Bethel Area	[05]	Bethel Census Division (includes southern half of [16] Kuskokwim Division).
060	Bristol Bay Borough	[06]	Bristol Bay Borough Census Division (N.C.).
070	Dillingham Area	[07]	Bristol Bay Census Division (includes Port Moller area from Aleutian Islands Census Division).
		[08]	Cordova-McCarthy Census Division (added to Valdez-Cordova Area 260).
090	Fairbanks North Star Borough	[09]	Fairbanks Census Division (N.C.).
100	Haines Borough	[10]	Haines Census Division (excludes Klukwan).
110	Juneau Borough	[11]	Juneau Census Division (N.C.).
120	Kenai Peninsula Borough	[12]	Kenai-Cook Inlet Census Division + [21] Seward Census Division
130	Ketchikan Gateway Borough	[13]	Ketchikan Census Division (N.C.).
140	Kobuk Area	[14]	Kobuk Census Division (N.C.).
150	Kodiak Island Borough	[15]	Kodiak Census Division (N.C.).
		[16]	Kuskokwim Census Division (divided between the Bethel Area 050 and the Yukon-Koyukuk Area 290).
170	Matanuska-Susitna Borough	[17]	Matanuska-Susitna Census Division (N.C.).
180	Nome Area	[18]	Nome Census Division (N.C.).
185	North Slope Borough	[04]	Barrow-North Slope Census Division (N.C.).
		[19]	Outer Ketchikan Census Division (added to Prince of Wales-Outer Ketchikan Area 200).
200	Prince of Wales-Outer Ketchikan Area	[20]	Prince of Wales Census Division + [19] Outer Ketchikan Census Division
		[21]	Seward Census Division (added to Kenai Peninsula Borough 120).
220	Sitka Borough	[22]	Sitka Census Division (excludes Port Alexander).
230	Skagway-Yakutat-Angoon Area	[23]	Skagway-Yakutat Census Division + [3] Angoon Census Division + Klukwan.
240	Southeast Fairbanks Area	[24]	Southeast Fairbanks Census Division (includes Eagle Area, excludes southern portion around Nebesna).
		[25]	Upper Yukon Census Division (added to Yukon-Koyukuk Area 290).
260	Valdez-Cordova Area	[26]	Valdez-Chitina-Whittier Census Division + [8] Cordova-McCarthy Census Division + Nebesna Area.
270	Wade Hampton Area	[27]	Wade Hampton Census Division (N.C.).
280	Wrangell-Petersburg Area	[28]	Wrangell-Petersburg Census Division (includes Port Alexander).
290	Yukon-Koyukuk Area	[29]	Yukon Koyukuk Census Division + [25] Upper Yukon Census Division (less Eagle area) + Northern half of [16] Kuskokwim Census Division

(N.C.) = No Change.

Exhibit 5
Standard Metropolitan Statistical Area, Boroughs, Census Areas, and Selected Places in Alaska, 1980



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ALLOCATION ACCURACY IN POPULATION ESTIMATES: AN OVERLOOKED CRITERION WITH FISCAL IMPLICATIONS*

David Swanson, Alaska Department of Labor

ABSTRACT

An annual set of county population estimates is an important service provided by State Demographic Centers and the U.S. Bureau of the Census. The standard techniques used for these estimates, although not usually acknowledged as such, can be viewed as a procedure used to allocate a State's population among its counties. While the accurate allocation of a State's population is important in its own right, it has implications for the revenue sharing programs of the Federal government and many States because an annual population estimate is an important—and for some States the sole—component in formulas used for allocating funds to counties and their recognized governmental subunits. This report argues that the concept of allocation accuracy should be routinely applied to population estimates used for fund allocations and, further, describes a summary measure of allocation accuracy termed the Index of Misallocation. It is also argued that both the ratio-correlation form of multiple regression, a standard technique used for population estimates, and the difference-correlation form, a variant recently receiving attention, have in common two distortions that render incomplete the traditional regression model evaluation criteria such as R^2 and S.E.E. Using these two regression methods in conjunction with county data for Washington State, the report demonstrates the utility of using the Index of Misallocation as a criterion for model evaluation. The report concludes that the Index should be included as one of the standard criteria for evaluating both these two regression forms and the actual allocation accuracy of estimates produced by these and other methods.

INTRODUCTION

While accurate county population estimates are important in their own right, they provide an important basis for allocating State and Federal general revenue sharing and other funds to counties and are usually made using the ratio-correlation form of multiple regression (Namboodiri, 1972; O'Hare, 1976; Pursell, 1970; Schmitt and Crosetti, 1954; Serow and Martin, 1977; and U.S. Bureau of the Census, 1973a); although the difference-correlation from of multiple regression (O'Hare, 1976; Schmitt and Grier, 1966; Spar and Martin, 1979; and Swanson, 1978) and other procedures and combinations of procedures may be used (Bogue, 1950; Namboodiri and Lalu, 1971; U.S. Bureau of the Census, 1973a; and Zitter and Shryock, 1964). These estimates of population for revenue sharing and other purposes are made by State Demographic Centers and the U.S. Bureau of the Census (Engels, 1978; Rosenberg and Myers, 1977; U.S. Bureau of the Census, 1973a; and Walker, 1976).

In terms of State revenue sharing, the total funds available for allocation within a given State are usually fixed by legislative action independently of population estimates and are based on revenue collections. While actual funding allocation formulas may utilize additional variables, "There are many states that now allocate state-generated revenues as well as selected federal grants wholly or partially on the basis of demographic information..." (Rosenberg and Myers, 1977). For example in the States of Florida (Doolittle and Jones, 1974), Washington (Washington, 1978), and Wisconsin (Wisconsin, 1973) current county population estimates are the sole component for allocating State revenue sharing funds directly to county governments, while in California (Hollman, 1979), a county population estimate is a component of its revenue sharing formula. In the Federal revenue sharing program, county population estimates are a component in determining the boundaries for revenue sharing funds allocated directly to subcounty units. Funds in this program are distributed first among States, then among the counties in each State and finally actually allocated directly to recognized subcounty units such as municipalities and townships (Heintz and Hart, 1973:20).

(See also Auten, 1974; Barth et al., 1976; Tomer, 1977; U.S. Bureau of the Census, 1973b; U.S. O.F.S.P.S., 1978; and U.S. Subcommittee on Census and Population, 1978.)

Although not usually acknowledged as such (for a notable exception see Patil et al., 1974), these county population estimates can be viewed as an allocation procedure, which, in general terms can be described as the problem of distributing N items among K mutually exclusive and exhaustive categories, where N is determined independently of the distribution procedure. County population estimates fall within this definition because the State total is always determined independently of the county population estimates, which, as has been implied, are always "controlled" to sum to the State total. In effect, the actual county estimates are never made in isolation from the current estimated State total and the historical pattern of population distribution by county. As is discussed later in this report, these two factors have, especially, important consequences for using the ratio-correlation and difference-correlation forms of multiple regression; consequences that have been too long overlooked. Where funds are allocated directly in accordance with county population allocations, the population allocations can be interpreted directly as funding allocations. Where funds are allocated using variables in addition to population estimates (whether these are distributed directly to a county government or, as in the case of Federal revenue sharing the municipalities and other recognized subcounty units within a given county), an evaluation of accuracy in funding allocations must be accomplished using funds allocated through estimates in comparison with funds allocated using actual population counts.[1]

This report argues that the concept of population allocation accuracy should be routinely included in evaluations of models and estimates resulting from them when population estimates are used for allocating funds. Because of the importance of accurately allocating funds, the millions of State and Federal dollars that are annually allocated, and the integral role that county population estimates play in determining these allocations, the report addresses the concept of allocation accuracy by focusing on county population estimates.

In order to provide a comparative basis to illustrate both the shortcomings of traditional model evaluation criteria and the utility of the proposed index for population allocation accuracy, the ratio-correlation and difference-correlation forms are evaluated using data for Washington State. Keep in mind that the purpose of this comparison is not to determine if one of the two regression forms is universally superior for allocating population. This issue should be reviewed on a State-by-State basis since it is an empirical rather than a theoretical question (Namboodiri, 1972:452). Neither is it implied by focusing exclusively on these two regression forms that other methods are inferior. It is, rather, the purpose of the report to illustrate the role that an index of allocation accuracy can play in the evaluation of competing regression models and the actual allocation accuracy of estimates produced by regression and other methods. The index, termed the *Index of Misallocation*, is described later in the report. This index, it is argued, is especially useful where the intent of an allocation procedure is to minimize either directly or indirectly the misallocation of finite funds or other resources.

THE REGRESSION FORMS

Both the ratio-correlation and the difference-correlation methods use proportional numbers, which means that the county populations must sum to an independently estimated State total. Both forms provide a model that estimates the temporal change in the county population proportions. The independent variables are the temporal changes in the county proportions of symptomatic indicators such as auto registrations, employment, registered voters, and the like. The only dissimilarity between the two forms is in the measurement of temporal change. In the ratio-correlation form, temporal change is measured by taking a ratio of proportions at two points in time, while in the difference-correlation form the temporal change is measured by subtraction. The models are described more formally in the appendix.

Once a model is constructed, the actual estimation is accomplished by algebraically manipulating the estimation of change in proportions into actual population numbers after estimating the changes in proportions using the current symptomatic indicators that have been substituted into the model. The estimated county population numbers are then adjusted to the independently derived total State population by multiplying the ratio of the independently derived State total to the sum of the estimated county populations by each estimated county population.

Although Ericksen (1973, 1974) argues that regression models incorporating sample data are useful in estimating county populations, this approach is not often found in actual practice. Consequently, the discussion of the regression models and procedures in this report is directed toward complete rather than sample data.

TEST DATA AND MODELS

Using Washington State as an example, enrollment in grades 1 to 8 is the county "population" selected for estimation because a series of annual estimates can be compared to a series of annual actual reported enrollment.[2] Three symptomatic indicators are used: employment (covered by unemployment insurance); registered voters; and registered private automobiles.[2] The two observation points over which the models are constructed are the census years, 1970 and 1960; the 39 counties of Washington are the cases. The years for which estimates derived from the 1970-1960 based models are compared with actual reported enrollments are 1971 through 1977. The three symptomatic variables used in the regression

[1] It is important to realize that the actual population counts against which estimates are judged for accuracy are themselves not "true" population totals. They merely represent a convention used for allocations. This point is pursued by Keyfitz (1979).

[2] The data used in the report are in the official Washington State Population Data Base maintained by the Forecast and Support Division, Office of Financial Management, Olympia, Washington.

forms were selected because they represent a subset of the four variables usually used to estimate county populations in Washington, the fourth variable being the grades 1 to 8 enrollment. Remember, the intent of the example data set is to illustrate the concept of misallocation and its measurement. The example data set is not meant to imply that the models that could be constructed using these three symptomatic indicators are those that would be actually used for county population estimates; neither it is meant to imply that an estimate of enrollment is a necessary step in producing a county population estimate. The example data set was selected because (1) it utilized a set of symptomatic indicators that were known to be "clean" and were readily available, without any prior knowledge of the behavior of the models (or their alternatives) that could be constructed from these data; and (2) because the estimated dependent variable could be compared with actual reported data for a current 8-year period—an evaluation not possible with actual county population figures, which would only be available for testing at a single point in time (1970) using models constructed over the 1960-1950 period.

Typically, the evaluation of candidate regression models involves a two-step procedure. The first step, termed here as the model construction step, is evaluated using traditional regression "goodness of fit" indicators such as R^2 and the Standard Error of Estimate (S.E.E.). The second step, termed here as the model estimation accuracy step, is conducted by comparing estimates produced by candidate models with actual, enumerated populations. Typically, the summary indices used in this second step are the mean of the absolute percentage differences, mean square error, or the number of times a given level of error is exceeded. The advantage of using both steps to evaluate candidate models is obvious: indices of model "fit" used in the first step can be checked against the indices of estimation "fit" used in the second step. However, a major disadvantage of this procedure is that it evaluates models that are two decades old. For example, the most recent models that have undergone the full evaluation are those that were constructed using 1960-1950 data and evaluated with 1970 census data. However, by using enrollment data as the dependent estimation variable, in this report models constructed using 1970-1960 data can be evaluated since enrollment data are available subsequent to 1970 for use in the second step of evaluation.

The two models constructed using the 1970-1960 data are described in table 1. Generally, both models exhibit favorable characteristics but using the traditional criteria, the Coefficient of Determination (R^2) and Standard Error of Estimate (S.E.E.), the difference-correlation model would be regarded as superior to the ratio-correlation model since the difference-correlation model has a higher R^2 and lower S.E.E.; although, especially for the S.E.E., this is because "differences" produce smaller values than do "ratios" over variables constructed using Washington State's symptomatic and enrollment proportions by county.

Although additional model evaluation criteria are available, such as residual examination (see, e.g., Draper and Smith, 1966; Goldberger, 1964), they still do not address the concept of allocation "goodness of fit"; Neither do the traditional measures of estimation "fit" for the second step of model evaluation (see, e.g., Goldberg et al., 1964; O'Hare, 1976; Pursell, 1970; Rosenberg, 1968; Serow and Martin, 1977; Martin and Serow, 1978; Spar and Martin, 1979; Swanson, 1978; Zitter and Shryock, 1964; or Zitter and Word, 1971). Before proceeding to an evaluation of the two models just described, it is appropriate to address the issue of allocation accuracy and describe a summary index for it.

MISALLOCATION AND ITS MEASUREMENT

Perhaps the most important impetus for annually estimating county and other sub-State area populations accurately is to provide a basis for the allocation of funds. To the extent that a

Table 1. Multiple Regression Models

Symptomatic indicator	Ratio-correlation form		Difference-correlation form	
	Unstandardized regression coefficient	Standardized regression coefficient	Unstandardized regression coefficient	Standardized regression coefficient
Intercept	−.01469	0.0000	0.0000	0.0000
Employment	.07633	.13889	−.42146	−.44870
Voters	.22181	.17617	1.49536	.79796
Registered Autos	.66428	.62861	.64890	.41239
R	.8679		.90619	
R^2	.7532		.82117	
Adj. R^2	.7321		.80584	
S.E.E.	.0744		.00259	
Index of Misallocation	2.73		2.90	

given State total population is misallocated among the State's counties, the funds from a given revenue sharing program depending on population estimates for allocation will also be misallocated. Where misallocation occurs, one or more counties obtain more than intended entitlements at the expense of one or more other counties, which, in turn, receive less than intended entitlements. As an example, suppose that funds are distributed directly in relation to population and that a given county is estimated to have 35 percent of the State's total population while in fact it has actually only 25 percent. This county, regardless of whether the State total population is incorrectly or accurately estimated, will receive 35 percent of the revenue sharing funds and the remaining counties will receive 65 percent. In this case, the county will unfairly receive 40 percent more than its entitlement while the remaining counties face a 10 percent loss in terms of state funds. Obviously, in order to conform to legislative intent, it is of paramount importance that county population estimates be accurate with respect to their shares of the State total when these estimates are used as a basis for fund distribution. It is equally obvious that misallocation is measured neither by the set of traditional measures used directly in evaluating model accuracy (such as goodness of fit measures like the coefficient of determination in the case of a regression model or mean square error, say, in the case of other procedures) nor by the set used in evaluating subsequent accuracy (means of squared errors or absolute percentage differences). A summary index that does directly measure misallocation is described in the following section.

A SUMMARY INDEX OF MISALLOCATION

Although it has been commonly found in the demographic and sociological literature for many years under different names, the *Index of Dissimilarity* (Duncan and Duncan, 1955; or Shryock and Siegel, 1973; 232-233) is, with a slight adaptation, immediately suitable as a summary index of misallocation. Defined in the following formula, this adaptation of the Index of Dissimilarity will be refered to as the Index of Misallocation (IM).

$$IM = \frac{(\frac{1}{2} \Sigma \left| P_{ei} - P_{ai} \right|)}{P} \times 100$$

Where P_{ei} = estimated population in county i,

P_{ai} = actual population in county i,

P = total state population, to which the values of P_{ei} are adjusted so that

$$P_{ei} = \frac{(P_{ei^*})}{(\Sigma P_{ei^*})} \times P$$

P_{ei^*} = unadjusted county i estimate

The index simply sums the absolute values of the differences between the adjusted estimates and the actuals, divides this sum by 2, divides the entire result by the total State population and, finally, multiplies the preceding steps by 100 so that misallocation is defined as a percentage. The index gives the percent of the total State population that must be reallocated in order to have the estimates achieve zero misallocation.

An example of the interpretation of the index is as follows. Suppose that there are four counties in a hypothetical State with the following estimated and actual populations. (Note that the estimated county populations have already been adjusted to this hypothetical State's total population).

County	Estimated	Actual
A	15,000	12,000
B	10,000	11,000
C	30,000	32,000
D	5,000	5,000

In this example, IM is found to be 5.00, which is interpreted to mean that 5 percent of the estimated county populations needs to be redistributed in order to achieve zero misallocation. The straightforward interpretation of misallocation available by using IM is not available with other, more traditional summary measures of error. For example, the mean of the absolute percentage errors, which for counties A through D is 10.09 percent, is computed without reference to the State total: each county's actual population is the denominator for the county's percentage error and the mean of these errors is referenced to the total number of counties. Since reference to the State total is lacking, the mean of the absolute percentage errors can not be interpreted in terms of the total allocation error experienced by the entire State: one can not say that 10.09 percent of the State's total population is misallocated; neither can one say that by redistributing, on the average, 10.09 percent of each county's population that zero misallocation will result. This mean—like mean square error—is simply not interpretable in terms of misallocation. There are other possible interpretations of misallocation.[3] However, IM is desirable because its interpretation is so straightfoward: it gives the percent of the State's total population that must be reallocated in order to achieve zero misallocation.

To the extent that revenue sharing funds are directly related to county population shares, the index is a proxy for the misallocation of funds. Note, also, that IM can be directly applied to funding allocations by measuring funds allocated using estimated populations in conjunction with funds allocated using actual populations. This direct evaluation of funding misallocation would be especially appropriate for the Federal revenue-sharing areas, which may be only bound by or depend upon a population estimate as a component of the revenue-

[3] In a personal communication from Fred Cavanaugh of the U.S. Bureau of the Census, other interpretations of accuracy described in internal Bureau memoranda were described. Patil et al. (1974) describe an alternative summary index of allocation error, but its interpretation is not as straightforward as that available for IM.

sharing fund allocation. With the concept of misallocation defined and a summary index for it, the allocation accuracy of the two models given earlier can be evaluated.

TEST RESULTS AND DISCUSSION

Using the models given in table 1, estimates of county school enrollments in grades 1 through 8, adjusted to the actual Washington State totals, were generated for each year 1971 to 1977 and compared with the actual reported enrollments. In addition, the 1970 end-point of the two observation years used to build the models was also evaluated in terms of comparing its adjusted estimated county enrollments to the actual county enrollments.[4] Using the Index of Misallocation, the annual level of allocation accuracy of the estimates is presented in table 2.

Table 2. Allocation Accuracy of the Two Regression Models

Year	Index of misallocation[1]	
	Ratio-correlation	Difference-correlation
1970[2]	2.73	2.90
1971	0.72	1.76
1972	0.10	3.43
1973	1.79	4.07
1974	2.24	3.88
1975	2.53	3.78
1976	2.76	3.60
1977	3.26	4.08

[1] Computed from estimates adjusted to the actual state total.
[2] End point of the two observation years used in model construction.

While both models exhibit generally low levels of misallocation, the summary level of misallocation is lower for the ratio-correlation generated estimates than for those derived from the difference-correlation model for each year. This evidence strongly supports an argument favoring the choice of the ratio-correlation over the difference-correlation model for estimating the county "population" selected for this test in Washington. Note that the Index of Misallocation is lower for the ratio-correlation model in 1970. This 1970 information presents a different perspective on the suitability of the two regression models than do the Coefficient of Determination and Standard Error of Estimate. The Coefficient of Determination and Standard Error of Estimate indicate the superiority of the difference-correlation model; although the IM values are only slightly different, the Index of Misallocation for 1970 indicates that the ratio-correlation model is superior in its allocation accuracy: obviously, these two traditional criteria, R^2 and S.E.E., do not directly measure allocation accuracy.

In the example just presented, the difference-correlation model would likely have been selected over the ratio-correlation model if only these traditional first-step criteria of model adequacy had been used and a second-step evaluation had not been undertaken. This point is worth some discussion. In some situations, the only evidence available for selecting a candidate model may be the first-step evaluation criteria. There are situations where it is not possible to conduct both steps of evaluation. Had this been the case for the example just presented, the difference-correlation model would probably have been selected over the ratio-correlation model if only the traditional criteria had been used. If this had been the case, it would have resulted in uniformly higher misallocation error for each of the years under examination, 1971 to 1977. However, by introducing the Index of Misallocation directly as a first-step model evaluation criterion and measuring the misallocation level of the 1970 estimates, the ratio correlation model is identified as superior in its allocation accuracy. This identification, as the example clearly shows, is not made by the traditional first-step criteria of R^2, S.E.E., and the like. The subsequent comparisons of allocation accuracy for the two models support the utility of applying IM as a first-step model evaluation criterion.

Although the concept of allocation accuracy may have more general applicability, it raises, as mentioned earlier, issues specific to the ratio-correlation and difference-correlation forms of multiple regression. These issues deserve additional attention. Both of these forms have been developed within and continue to be used solely within the field of population estimation. They are not commonly found within applied areas that may be more familiar to statisticians. As a result of this insulation from the greater community of statisticians, there remain two subtle, and until now, unanlyzed characteristics that create distortions that contribute to the inability of traditional measures of "goodness of fit" to capture the implicit intent of these regression forms: accurate allocation.

The more general characteristic is that these forms rely on transformed data to effect the allocation of N items among K categories, where N is determined independently of the regression model. The transformations produce a dependent variable in the model that is the temporal change in a proportion. This transformation is at once useful because it controls for differential population size and yet allows for the algebraic manipulation of a model's estimates of these temporal changes into actual population numbers. This is, indeed, a powerful and flexible feature of both of these regression forms. However, at the same time, it does not allow a direct evaluation of allocation accuracy since the dependent variable in the model must be algebraically manipulated and controlled to an independently determined State total to produce the final, usable result—a set of county populations. Consequently, the summary statistics such as R^2 and S.E.E. suffer from the same problem outlined earlier for the mean of absolute percentage errors: they are

[4] It would also have been just as easy to transform the estimated change in enrollment proportions between 1960 and 1970 into the 1960 allocation of enrollment by county. Consequently, an IM value for 1960 instead of 1970 could have been calculated.

computed without reference to a State total and, consequently, do not offer an evaluation of allocation accuracy. Without a measure like IM, an evaluation of the adequacy of these two regression forms is incomplete: They are used to generate temporal changes in proportions that are algebraically manipulated into population allocations while at the same time no assessment of allocation accuracy is possible within the regression forms.

The second distorting characteristic, subsumed within the first but a distinct issue, is that the historical pattern of the distribution of a given State's population among its counties ultimately shapes the allocation generated from a given regression model. In Washington for example, about 30 percent of the State's total population resides in only one of its 39 counties. Since this pattern of dominance persists over time, the specific allocations are always shaped by it because the most recent county population census number is used in the algebraic manipulation resulting in a current population estimate. Since this historical pattern is external to the regression model, again, the suitability of a given model is never fully captured by traditional measures of fit such as R^2 and S.E.E. While the pattern of county population distributions that exists in Washington may not be the same as those found in other States, the fact remains that in any State its historical pattern will never be reflected in the traditional model evaluation criteria. Consequently, a measure like IM is, again, required in order to evaluate the "allocation fit" of a given model.

The example results strongly support the argument that IM should be used as a criterion of model "fit" in the first step of model evaluation. The finding that the IM value in the first step indicated the subsequent allocation accuracy differentials found in the second step of evaluation may be useful in situations where second-step evaluations are not possible or for some reason they are not used. However, IM should not be used as a sole criterion for evaluating models using the ratio-correlation or difference-correlation forms. The instability of variable relationships over time is potentially so strong that an estimation procedure must be prepared to utilize external information (see, e.g., Swanson, 1978).

Because of this instability and other problems, IM cannot be expected to quarantee the adequacy of subsequent estimates using a model it favors, although it does accomplish this with the data presented here. Additional examinations in other States using the full two-step evaluation procedure are needed. Another cautionary note is that IM is intended to be a summary measure of allocation error. It does not indicate where the allocation error occurs relative to individual cases. In many situations, it is important to take into account individual county errors. Selection of any model or procedure requires some degree of judgment, and evidence based on a county-by-county examination is often useful.

SUMMARY

This report argues that allocation accuracy is an important dimension of population estimation accuracy that should be routinely applied to evaluations involving population estimates since many of these estimates are used for funding allocations. This perspective is, of course, not of particular interest to an individual county or other revenue receiving subunit; it is of interest when taken over a logical set of counties or other subunits. The report describes a summary measure of allocation accuracy, the Index of Misallocation, which is designed to capture this dimension of accuracy and give it a clear, concise meaning. Given the millions of Federal and State dollars that are annually allocated using population estimates[5]—and the intent of legislation regarding the accurate allocation of these funds—it is remarkable that this concept has not been routinely used. This absence is especially noticeable in conjunction with population estimates derived from the two regression forms discussed in the report, which are used solely for estimation of population, and for which the concept of allocation "goodness of fit" is completely overlooked in standard manuals and the literature. The Index of Misallocation should be used as one of the criteria of model adequacy for these regression forms and, further, as a criterion of "estimation" fit in the second step of model evaluation usually undertaken in studies of estimation accuracy. Like existing criteria, it should not be used to the exclusion of other information.

In view of the approach of the availability of data from the 1980 Census of Population and the opportunity to test and refine regression and other types of estimation methods, the discussion of allocation accuracy is timely. The summary index of allocation error described in the report can be easily included in any evaluation. Its inclusion is important because it offers an assessment of allocation accuracy, the fiscal implications of which can be immediately grasped by administrators, policymakers, and other nontechnical personnel at the Federal, State, and local levels. This potential area of use of the concept of allocation accuracy provides the index described here with advantages over other possible indices of allocation accuracy because of its clear interpretation and its long history of use in other areas (For recent discussions see Cortese et al., 1976 and 1978; and Massey, 1978).

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[5] For example, in 1979, the official county population estimates for Washington, produced with the aid of the ratio-correlation method, provide a basis for the direct allocation of over $8 million to county governments and $79 million to subcounty governmental units in 1980. (Washington, 1979: i).

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Appendix

The ratio-correlation and difference-correlation forms of multiple regression are defined as:

$$Y = a_0 + a_1 x_1 + a_2 x_2 + , \ldots , + a_k x_k + E$$

Where (1) a_i = coefficient to be estimated
E= error term

(2.a) In the ratio-correlation form:

$$Y = \frac{\text{(Population in County, time} = T_{0+x})}{\text{State Total Population}} \div \frac{\text{(Population in County, time} = T_0)}{\text{State Total Population}} = \frac{Yx}{Yo}$$

$$X_i = \frac{\text{(Symptomatic Indicator in County, time} = T_{0+x})}{\text{State Total Indicator}} \div \frac{\text{(Symptomatic Indicator in County, time} = T_0)}{\text{State Total Indicator}} = \frac{X_{ix}}{X_{io}}$$

(2.b) In the difference-correlation form:

$$Y = Y_x - Y_o$$

$$X_i = X_{ix} - X_{io}$$

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IMPROVING ACCURACY IN MULTIPLE REGRESSION ESTIMATES OF POPULATION USING PRINCIPLES FROM CAUSAL MODELLING*

David Swanson, Alaska Department of Labor

Abstract—This paper reports a mildly restricted procedure for using a theoretical causal ordering and principles from path analysis to provide a basis for modifying regression coefficients in order to improve the estimation accuracy of the ratio-correlation method of population estimation. The modification is intended to take into account temporal changes in the structure of variable relationships, a major element in determining the accuracy of post-censal estimates. The modification of coefficients is conservative in that it uses rank-ordering as a basis of change. Empirical results are reported for counties in Washington state that demonstrate the increased accuracy obtained using the proposed procedure.

INTRODUCTION

Most procedures intended to improve regression estimation accuracy are based on modifications introduced during model construction. These procedures include variable selection, variable transformation, higher-order forms, data augmentation and ridge regression. Most of these types of procedures have been applied to the "ratio-correlation method," a regression technique introduced by Schmitt and Crosetti (1954) and now commonly used for making post-censal estimates of subnational populations. For example, variable selection is discussed by Goldberg, Rao and Namboodiri (1964) and Zitter and Shryock (1964); variable transformation by Schmitt and Grier (1966), O'Hare (1976) and Swanson (1978b); data augmentation by Rosenberg (1968), Pursell (1970), Namboodiri and Lalu (1971) and Martin and Serow (1978); and ridge regression by Swanson (1978a) and Spar and Martin (1979). One limiting feature common to these types of procedures is that they are only applied to the data used in constructing a given regression model (i.e., to the "model data set") and do not incorporate subsequent post-censal information, say, for example, from the predictor variables substituted into a given regression model in order to produce an actual post-censal estimate (i.e., information from the "estimation data set"). The issue of utilizing more fully information available subsequent to the construction of a given model is important. Studies by Namboodiri and Lalu (1971), Ericksen (1974), Namboodiri (1972), O'Hare (1976), Martin and Serow (1978), Swanson (1978a), Spar and Martin (1979), Tayman (1979) and Mandell (1980) have all implicated the temporal stability of model coefficients as a primary element in the accuracy of post-censal estimates.

One example of a procedure that does incorporate information subsequent to that available from the "model data set" is given by Ericksen (1974). This procedure, the "regression sample method," incorporates current sample data and symptomatic information in order to produce more accurate estimates of post-censal populations. However, this procedure has not caught on, probably because of the increased complexity and data collection burden it requires.

In this paper, an alternative procedure for improving regression estimation accuracy is introduced which, like Ericksen's, utilizes the information external to the model data set used in constructing a regression model but, unlike his, is gained solely from the "estimation data set." The procedure is subject to two limitations: it can only be applied to situations in which reasonable assurance of the correct specification of a causal ordering of variables is obtained and in which each correlation between the predictor variables and the dependent variable can be assumed to be positive. While these two restrictions may be incapacitating in some estimation problems, they do not preclude using the procedure in the majority of problems relating to county, state or other local area population estimates using the symptomatic indicators typically found in conjunction with the ratio-correlation method (see, e.g., U.S. Bureau of the Census, 1973; 1976). For example, it is reasonable to assume that a model which specifies county population as causally prior to county voters, employment and school enrollment is a correctly postulated theoretical structure. It is physically impossible to have voters, employment and school enrollment without a population; on the other hand, while it may be unlikely, it is possible to have a county population without voters, or employed persons, or students.[1]

The second limitation, that of a positive correlation between the dependent variable and each of the predictor variables, while more constraining than the idea of a causally prior population variable, does not hinder the procedure for most states.[2] The U.S. Bureau of the Census (1976, pp. 70–74) reports only ten states in which the relationship between the dependent variable is negative for state-specific ratio-

correlation models used for county population estimates. In these states (Colorado, Delaware, Maryland, Minnesota, Mississippi, Nevada, New Mexico, Rhode Island, Vermont, and West Virginia) the procedure could still be used by eliminating the variable or variables in question and re-constructing the model. It would, of course, be advisable to weigh the costs of variable reduction against the additional information gained by using the procedure.

THE RATIO-CORRELATION METHOD

The ratio-correlation method uses proportional numbers, which means that the county populations must sum to a state total population, which in an estimation year is determined independently of the regression-estimated county populations. The model is designed to estimate the temporal change in county population proportions using the observed temporal changes in the county proportions of symptomatic indicators such as school enrollment, voters, and the like. The temporal change is measured simply by taking a ratio of the proportions at two points in time for each variable—hence the name ratio-correlation. Since enumerated county populations for an entire state are found only for federal decennial census years, the model is always constructed for two points in time that are ten years apart. The data underlying this construction are termed the "model data-set." For example, in Washington state, a ratio-correlation model used to estimate annual county populations from 1971 to 1979 was constructed using the ratio of 1970 to 1960 proportions.

Once a model is constructed, the actual estimation is accomplished by algebraically manipulating the estimation of change in proportions into actual county population numbers. The estimated county population numbers are then adjusted to the independently determined total state population and, often, smoothed to provide orderly transitions from earlier estimates.

An example of this procedure for the year 1972 follows: first, 1972 over 1970 ratios of symptomatic indicator proportions are substituted into the model that was constructed using ratios of 1970 over 1960 data. These ratios of proportions are the "independent" variables in the model. Next, the model is run and estimated ratios of 1972 over 1970 county population proportions are generated. Since the 1970 county populations are known, these estimates can be algebraically manipulated into estimated 1972 proportions. These, in turn, are then multiplied by the independently derived state total and adjusted and smoothed where necessary. A more formal description of the ratio-correlation model is given below.

$$Y = a_0 + a_1x_1 + a_2x_2 + , \cdots , + a_nx_n + E \qquad (1)$$

Where

a_i = coefficient to be estimated
E = error term

In the ratio-correlation form:

$$Y = \frac{\text{(Population in County, time = } T_{yx})}{\text{State Total Population}} + \frac{\text{(Population in County, time = } T_o)}{\text{State Total Population}} = \frac{Yx}{Yo}$$

$$X_i = \frac{\text{Symptomatic (Indicator in County, time = } T_{yx})}{\text{State Total Indicator}} + \frac{\text{Symptomatic (Indicator in County, time = } T_o)}{\text{State Total Indicator}} = \frac{X_{ix}}{X_{io}}$$

Although equation (1) is readily understandable, it is more convenient to use matrix notation to represent it. (For a good introduction to the matrix approach to regression, see Draper and Smith, 1966.) Equation (1) in matrix form is denoted by

$$\mathbf{Y} = \mathbf{XB} + \boldsymbol{\epsilon} \qquad (2)$$

where the $n \times p$ matrix $\mathbf{X}$ contains the values of p predictor variables at each of the n data points. $\mathbf{Y}$ is the vector of values for the dependent variable, $\mathbf{B}$ is the $p \times 1$ vector of regression coefficients, and $\boldsymbol{\epsilon}$ is an $n \times 1$ vector of stochastic errors, where $E(\boldsymbol{\epsilon}) = \mathbf{0}$, and $E(\boldsymbol{\epsilon}\boldsymbol{\epsilon}') = \sigma^2\mathbf{I}_n$.

Further, it is also convenient to consider equation (2) in correlation form. That is, in a form where the variables are standardized by centering each observation on its mean and scaling it by dividing by the standard deviation of the variable in question. (See, again, Draper and Smith, 1966.)

In its correlation form, the estimate of B is given by

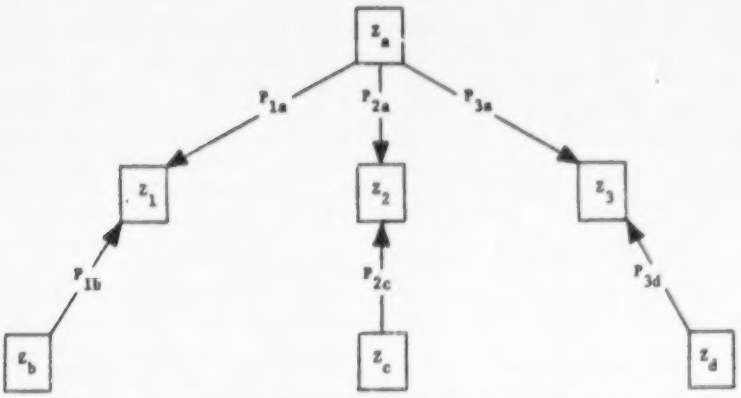
$$\hat{\mathbf{B}} = (\mathbf{X}'\mathbf{X})^{-1}\mathbf{X}'\mathbf{Y} \qquad (3)$$

with $(\mathbf{X}'\mathbf{X})$ being the zero-order correlation matrix for the independent variables, and $(\mathbf{X}'\mathbf{Y})$ the vector of zero-order correlations between each of the independent variables and the dependent variable.

Throughout this paper, the intent of the procedures described is to produce a modified $\hat{\mathbf{B}}$ vector, primarily by exploiting information for $(\mathbf{X}'\mathbf{X})_e$, where the subscript "e" identifies an "estimation data set." An established procedure for producing modified $\hat{\mathbf{B}}$ vectors is ridge regression (Hoerl and Kennard, 1970) which is used in the presence of multicollinearity in order to stabilize the estimate of the regression coefficient vector. However, ridge regression is designed to deal with instability caused by multicollinearity not instability caused by structural changes over time, although in some applications it may be difficult to distinguish between these two causes of instability. In any event, ridge regression and other procedures mentioned earlier do not exploit the information always available from the zero-order correlation matrix $(\mathbf{X}'\mathbf{X})_e$ for the predictor variables in an estimation data set. In these procedures, predictor values are simply plugged into the coefficients previously calculated from the model data set and the estimated values for the dependent variable are generated. Ignoring the relationships found in the zero-order correlations among the predictor variables in the estimation data set disregards information that can be used to modify $\hat{\mathbf{B}}$ and improve the accuracy of estimated values.

CAUSAL MODELLING AND PATH ANALYSIS CONCEPTS

The key to exploiting the information contained in the zero-order correlations found in an estimation data set is taken from Land (1969, Chapter IV), work that is based on the fundamental theorem underlying path analysis as developed by Wright (1921). As stated in the Introduction and footnote 1, it involves a theoretical "reversal" of the dependent variable in the regression model, the population variable, as an unmeasured, causally prior variable and a "just-identified" structure—a minimum of three predictor variables (in the regression model), the covariance of which is assumed to be due to the fact that they are all causally related to the population variable. The path diagram specifies this theoretical "reversal."Let



Z_i = a variable in standard form (subtracted from its mean and divided by its standard deviation)
Z_a = the population variable
Z_1 = predictor variable 1
Z_2 = predictor variable 2
Z_3 = predictor variable 3
Z_b, Z_c, and Z_d = residual effects
r_{ij} = the zero-order correlation between variable i and variable j.

If the causal structure is adequately specified, then the following relations hold:

$$r_{12} = (P_{1a})(P_{2a})$$
$$r_{13} = (P_{1a})(P_{3a}) \qquad (4)$$
$$r_{23} = (P_{2a})(P_{3a})$$

Further, from the above system, if P_{1a}, P_{2a}, and P_{3a} can be assumed to be positive, a system of three linear equations in three unknowns can be made using logarithmic transformation in order to solve for $\ln(P_{1a})$, $\ln(P_{2a})$ and $\ln(P_{3a})$.

$$\ln(r_{12}) = (1)\,|\ln(P_{1a})| + (1)\,|\ln(P_{2a})| + (0)\,|\ln(P_{3a})|$$
$$\ln(r_{13}) = (1)\,|\ln(P_{1a})| + (0)\,|\ln(P_{2a})| + (1)\,|\ln(P_{3a})|$$
$$\ln(r_{23}) = (0)\,|\ln(P_{1a})| + (1)\,|\ln(P_{2a})| + (1)\,|\ln(P_{3a})|$$

Once the unknowns are found they are transformed into estimates of P_{1a}, P_{2a}, and P_{3a}, which are also estimates of r_{1a}, r_{2a}, and r_{3a}, respectively since $P_{1a} = r_{1a}$, $P_{2a} = r_{2a}$, and $P_{3a} = r_{3a}$. These estimates are the basis for modifying an original regression model's coefficients. The actual process of modification will be discussed in the subsequent section.

If more predictor variables are available, i.e., more than three, using the theoretical causal structure specified above leads to an over-identified model which in turn can be used to test the adequacy of the specified causal structure. This point is pursued by Land (1969) and Heise (1969).

At this point, one might think that if reasonable estimates of the correlations are available between the dependent variable and the predictor variables for an estimation data set, why not simply use these to re-estimate the original coefficient vector, $\hat{\mathbf{B}}$. This approach is usually blocked by two factors. The first is that the coefficient vector, $\hat{\mathbf{B}}$, is extremely sensitive to estimation errors in a given (X'Y) matrix. Even small error could lead to a significantly different coefficient vector which could produce less accurate estimates than an unmodified, original coefficient vector. The second factor is that in order to transform the modified estimated (standardized) coefficient vector into the unstandardized regression coefficients (and, consequently, to have, by definition an intercept in the regression equation) needed for an actual estimation of the dependent variable, an estimate of the variance of the dependent variable must be available. This variance is not available for an estimation data set, since by definition, an estimation data set excludes any observations of the dependent variable. Further, it does not appear to be stable enough to estimate its value from that contained in the model data set although this must be determined empirically for specific estimation problems.

THE RANK-ORDER PROCEDURE

At this point it is useful to provide some notation.

Let

$(X'X)_m$ = the zero-order correlation matrix for the p predictor variables in the model data set, the subscript "m" refers to the model data set,

$\hat{B}_m = (X'X)_m^{-1}(X'Y)_m$, the coefficient vector estimated from the model data set,

$(X'X)_e$ = the zero-order correlation matrix for the p predictor variables in the estimation data set, which is always available in an estimation situation,

$\hat{B}_e = (X'X)_e^{-1}(X'Y)_e$, the coefficient vector that would result if in an estimation data set the dependent variable could be observed. (In actual practice, $\hat{B}_e$ is unknown because $(X'Y)_e$ is unknown.) And

$(X'Y)_e^*$ = the zero-order correlation vector for each of the p predictor variables with the (unknown) dependent variable that is *estimated* for the estimation data set using the rank-order procedure.

Further, let the p unique correlation coefficients appearing in $(X'Y)_m$ and (the unknown) $(X'Y)_e$ be ranked in descending order in $\mathbf{R}_m$ and $\mathbf{R}_e$, respectively. The correlation coefficients that are estimated using the rank-order procedure and contained in $(X'Y)_e^*$ are placed in descending rank-order in $\mathbf{R}_e^*$. By either calculating to a high number of significant digits or using a procedure to decide among any ties within $\mathbf{R}_m$ and $\mathbf{R}_e^*$, respectively, there are p^2 pairwise comparisons of ranks that can be made for p predictor variables between $\mathbf{R}_m$ and $\mathbf{R}_e^*$ and a minimum of zero and a maximum of p re-orderings of the ranked coefficients in $\mathbf{R}_m$ such that their rank order becomes equivalent to their corresponding rank-order in $\mathbf{R}_e^*$. This re-ordering of ranks in going from $\mathbf{R}_m$ to $\mathbf{R}_e^*$ is the basis of the procedure. The key is in estimating $(X'Y)_e^*$ and, consequently, placing these correlations in descending rank-order in $\mathbf{R}_e^*$. This key is found in the causal structure outlined earlier. While, as it was stated earlier, it is usually not feasible to use $(X'X)_e$ in conjunction with the algebraic manipulations possible from the specified causal structure to directly estimate $(X'Y)_e$, and, consequently, $\hat{B}_e$, it is reasonable to assume that the estimated correlations, $(X'Y)_e^*$ *are in the same rank-order* as those in $(X'Y)_e$. The

reasonableness of this assumption is directly related to the reasonableness of the causal structure specified. In turn, the rank-orders in $\mathbf{R}_m$ and $\mathbf{R}_s^*$ are the same as the rank-orders in $\hat{\mathbf{B}}_m$ and $\hat{\mathbf{B}}_s$, respectively. Consequently, the change in rank-order, if any, observed in going from $\mathbf{R}_m$ to $\mathbf{R}_s^*$ can be used to modify $\hat{\mathbf{B}}_m$ such that it conforms to the (unobserved) rank-order in $\hat{\mathbf{B}}_s$. Further, since the variance of each of the variables in the model data set is known, $\hat{\mathbf{B}}_m$ (which is, remember, in standardized form), modified to conform to the rank-order found in $\mathbf{R}_s^*$, can be manipulated into a modified set of unstandardized regression coefficients, which can be used to provide an alternative estimate of the dependent variable.

Although others are feasible, the modification of coefficients proposed here is intended to provide a conservative approach. The actual modification proposed is as follows. First, $\mathbf{R}_m$ and $\mathbf{R}_s^*$ are determined. Since $\mathbf{R}_m$ preserves the same rank-ordering found in $\hat{\mathbf{B}}_m$, the coefficients in $\hat{\mathbf{B}}_m$ can be incremented by selected values such that their rank-order is modified to conform to the rank-order in $\mathbf{R}_s^*$. By using "minimum" increments, this procedure assumes even more of a conservative approach to modifying the coefficients in $\hat{\mathbf{B}}_m$.

The use of "minimum" increments has two major issues associated with it that require clarification. The most obvious one is the selection of a value for the increment. Should it be in tenths, hundredths, thousandths, or even more detailed? In an actual application the selection of a useful increment should be determined both by the magnitude of change required and by the judgment of the user. The other issue is how to apply the selected increment to a set of coefficients. A set of two hypothetical examples will help with the required clarification. In the first hypothetical example, suppose that there are only two predictor variables, X_1 and X_2, whose standardized regression coefficients in the original model are B_{1a} = .52 and B_{2a} = .48, respectively. Suppose further that using the subsequent information derived from the zero-order correlations in the estimation data set, $(X'X)_s$, B_{1s} is indicated to be less than B_{2s}. How does one now select—and apply—an increment of change to the original coefficients such that the modified B_{1a} is made to be less than B_{2a}? Obviously, by arbitrarily changing B_{1a} to .40 and leaving B_{2a} at .48 the desired new rank-ordering will be achieved. Such an arbitrary approach, however, could decrease the accuracy of an estimation because it ignores certain theoretical and empirical regularities of the ratio-correlation form of multiple regression.

These regularities can help provide a useful set of guidelines for conservatively changing the original coefficients. First, recall that in a multiple regression equation the sum of the standardized model coefficients is finite. Further, in the ratio-correlation form, this sum consistently approximates 1.00 regardless of the number of predictor variables. Also, under the limitations given for this entire procedure, each independent variable is positively correlated with the dependent variable. These regularities imply that a change in one coefficient should be balanced by a corresponding change in the opposite direction. In the hypothetical example given, the arbitrary reduction of B_{1a} from .52 to .40 results in a coefficient vector that is "too short" in terms of its expected sum. Where the original sum was .52 + .48 = 1.00, the sum of the modified set is only .40 + .48 = .88. In order to conform to its expected sum, the modified coefficient vector should, in this example, be equal to 1.00. This can be accomplished by matching each decrease in B_{1a} with a corresponding increase in B_{2a}.

At this point one question still remains unanswered. What value should be selected as an increment for modifying the set of coefficients? If .1 is used, at the first step B_{1a} will be reduced to .52 − .10 = .42 and B_{2a} will be correspondingly increased from .48 by .10 to .58. If .00001 is used, the point where the desired rank-ordering is achieved is where B_{1a} = .49999 and B_{2a} = .50001. Here, a useful guideline to follow in order to achieve a meaningful yet conservative change is to define the desired point of reversal in terms of empirical referents. Typically, this will probably be in terms of hundredths for many ratio-correlation models but some degree of experimentation is advised for any given application. When the number of coefficients exceeds two (which will usually be the case in actual practice), additional consideration must be given to the manner in which the sum of the original coefficient vector is preserved. For example, in a three coefficient system, there are exactly 3! = 6 possible outcomes for the new rank-ordering. In one of these outcomes, the same rank-ordering found in the original set is preserved; consequently, no modifications are required. In three of these possible outcomes, only two of the coefficients change ranks; consequently, the same procedure for making corresponding changes that was outlined in the hypothetical example for two coefficients can be used. That is, since the only possible changes are in (1) B_{1a} and B_{2a} or in (2) B_{1a} and B_{3a} or in (3) B_{2a} and B_{3a}, the balance necessary to preserve the original coefficient sum can be maintained by making changes in only the two coefficients in question; the third coefficient does not require any change. However, in the two remaining of the six possible outcomes, where all three coefficients change ranks, the balance must be maintained by making changes in all three coefficients.

This, however, is still not a very complicated matter. In both of these two outcomes, one coefficient changes rank by going from either the highest to the lowest rank or from the lowest to the highest. The remaining two coefficients each change one rank in the direction opposite to the change in the other one. This implies that the increment (or decrement) used for the single coefficient undergoing the maximum change of rank can be balanced by splitting its value equally between the other two and moving them in the opposite direction. For example, assume that the original coefficients are B_{1a} = .5, B_{2a} = .3 and B_{3a} = .2, and that these need to be changed so that B_{3a} becomes the largest, B_{1a} the second largest, and B_{2a} the smallest. In the first step, B_{3a} is increased by .1 to .30; the corresponding changes in B_{1a} and B_{2a} are .50 − .05 = .45 and .30 − .05 = .25, respectively. In the second step, B_{3a} is again incremented by .1 from .3 to .4; B_{1a} and B_{2a} are decremented by .05 to .40 and .20, respectively. In the final step, B_{3a} is incremented by .1 to .5 while B_{1a} and B_{2a} are each decremented by .05 to .35 and .15, respectively. This last step gives the coefficient values required to conform to the desired rank-ordering using the "minimum" increment, conservative procedure. As the number of coefficients increases, the problem becomes more complicated but it is still manageable since it reduces to a series of counting rules. In actual practice, the number of coefficients is usually under five and consequently it is possible to solve the majority of outcomes by hand—although this may become tedious. For those situations involving a number of coefficients a computer algorithm can be easily developed from basic counting rules and the allocations that were demonstrated in the two preceding examples.

It is important to bear in mind that the procedure outlined here is not the only one that could be used as a basis for coefficient modification. It is suggested because, in the absence of additional testing, it is likely to produce more accurate estimates than an unmodified model, espe-

Table 1.A.—Correlations between Variables in the "Model" Data Set

	$(X'X)_m$			$(X'Y)_m$
	X_1	X_2	X_3	Civ. Pop. < 65 Yrs. X_a
X_1 (employment)	1.000	.69379	.66318	.73138
X_2 (voters)	.69379	1.000	.81169	.93228
X_3 (enrollment)	.66318	.81169	1.000	.91942

cially if a great deal of change has occurred in the structure of the relationships for the variables in question; no claim is made for it producing an optimally accurate estimate.

EMPIRICAL RESULTS

Table 1.A gives the zero-order correlations relating to a 1960–1950 based ratio-correlation model for estimating county civilian population under sixty-five years from employment, voters, and grades 1-8 enrollment for the state of Washington.[3] Characteristics of the model constructed from these data are given in Table 1.B. In Tables 2.A and 2.B similar results are given for the 1970–1960 period. This set forms the estimation data over which the procedure will be used and tested.

Although full knowledge of the estimation data set is available, the procedure is used as if this were not the case and the known results in Table 2—and for any estimation problem—is $(X'X)_e$ which is used in conjunction with the theorem to estimate the rank-order of the (unknown) coefficients in R_e and, consequently, provide the re-ordering to which $\hat{B}_m$ will be modified for conformation. Observe that in Table 1.A, the correlations in $(X'Y)_m$ are ranked:

R_m	Rank
r_{2a}	(1)
r_{3a}	(2)
r_{1a}	(3)

Table 1.B.—Model Results

	$\hat{B}_m$ Standardized Regression Coefficients	Unstandardized Regression Coefficients
X_1	.07533	.066786
X_2	.51085	.550365
X_3	.45481	.356083
Constant	------	.046618

Multiple Correlation Coefficient, R = .97443
R^2 = .94953
Adjusted R^2 = .94519
S.E.E. = .05022

Let the causal structure (as in the path diagram) be specified for the model data set (Table 1.A) and estimated data set. Then, for the model data set, the system of equations to be solved would be:

$$\ln(.69379) = (1)|\ln(P_{1a})| + (1)|\ln(P_{2a})| + 0$$

$$\ln(.66318) = (1)|\ln(P_{1a})| + 0 + (1)|\ln(P_{3a})|$$

$$\ln(.81169) = 0 + (1)|\ln(P_{2a})| + (1)|\ln(P_{3a})|$$

Solving the preceding system leads to:

$$\hat{P}_{1a} = \hat{r}_{1a} = .75290$$

$$\hat{P}_{2a} = \hat{r}_{2a} = .92146$$

$$\hat{P}_{3a} = \hat{r}_{3a} = .88082$$

These values correspond very closely to the correlations actually computed for the model data set which are $r_{1a} = .7314$, $r_{2a} = .9323$, and $r_{3a} = .9194$. The causal structure specified appears to be reasonable for the model data set. In an actual application, the preceding comparison is recommended. If the estimated correlations are at least not in the same rank-order as the calculated correlations then the procedure may not be adequate since the causal structure specified is not adequate.

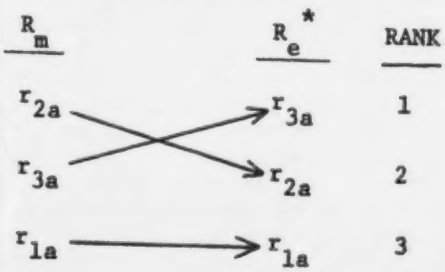
Using the same causal structure and system of equations given above for the estimation data set leads to the following estimate, i.e., $(X'Y)_e^* =$

$$\hat{P}_{1a} = \hat{r}_{1a} = .635210$$

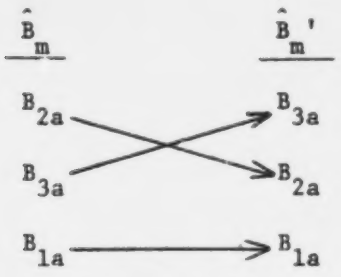
$$\hat{P}_{2a} = \hat{r}_{2a} = .758055$$

$$\hat{P}_{3a} = \hat{r}_{3a} = .973848$$

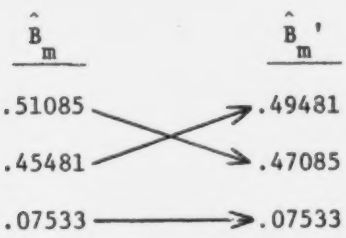
Notice that these estimated values of the true (and, remember, in actual practice, unobservable) correlations are less accurate than those estimated for the model data set. This decline in accuracy is related to the changing structure of relationships for these variables. In spite of the decline in accuracy, $(X'Y)_e^*$ still preserves the correct rank-ordering in $(X'Y)_e$. Ordering the correlations in $(X'Y)_m$ and $(X'Y)_e^*$ by descending rank in R_m and R_e^*, respectively, leads to the following "map" of indicated changes:



Using the changes in rank-order observed in going from $\mathbf{R}_m$ to $\mathbf{R}_m^*$, $\hat{\mathbf{B}}_m$ can be modified in the following manner in order to provide the type of change described earlier,



The actual values are:



Note that here the increment selected was .01, as was suggested earlier. Some experimentation may be useful in other applications.

With these modified estimates of the standardized regression coefficients and the standard deviations of the variables in the model data set, which are .2145, .2420, .1991, and .2740 for X_a, X_1, X_2, and X_3, respectively, the modified unstandardized coefficients can be estimated using the relationship $b'_{mi} = \hat{B}'_{mi}(s_{ma}/s_{mi})$. The modified model in raw form becomes, then

$$\hat{Y} = .046618 + .066787X_1 + .50727X_2 + .38736X_3.$$

Estimates for 1970 of the county civilian population under sixty-five years of age (adjusted to the independently estimated state total) resulting from the preceding modified model and its unmodified version are presented in Table 3 along with the actual enumerated populations. Examination of the individual estimates produced by the original and modified versions of the model reveal that the modified model provides a higher degree of accuracy. Summary statistics bearing out this impression are given in Table 4.

The mean of the Absolute Percent Error is noticeably lower for the estimates provided by the modified version. The Index of Misallocation (IM) (see Palit et al., 1974 or Swanson, 1980) is a measure of total allocation accuracy relative to the entire state. Unlike the mean of the absolute percentage error—which is referenced to the individual counties—IM is referenced to the entire state. It is interpreted as the percentage of the entire state total that would have to be re-allocated in order to have the estimated county populations conform to the actual county populations. Although the difference may not seem great, 1.560 percent must be re-allocated to achieve zero mis-allocation using the original model while 1.493 percent must be re-allocated using the modified version, this level of improvement can mean a greal deal when, as is often the case, these estimates are used to allocate funds.

Table 2.A.—Correlations between Variables in the "Estimation" Data Set

	$(X'X)_e$			$(X'Y)_e$
	X_1	X_2	X_3	X_a
X_1 (employment)	1.000	.48155	.61864	.65478
X_2 (voters)	.48155	1.000	.73827	.83726
X_3 (enrollment)	.61864	.73827	1.000	.88966

Table 2.B.—Model Results

	$\hat{B}_e$ Standardized Regression Coefficients	Unstandardized Regression Coefficients
X_1	.15351	.081743
X_2	.38825	.473637
X_3	.50805	.492240
Constant	------	-0.559175

Multiple Correlation Coefficient, R = .93680
R^2 = .87759
Adjusted R^2 = .86709
S.E.E. = .05077

DISCUSSION

Perhaps the first point that deserves attention is the similarity of the unmodified estimates to the modified estimates. The ratio-correlation model for the empirical period under consideration already achieves a relatively high degree of accuracy. However, because data are only available at ten-year intervals for evaluating the estimates produced by different models, the actual estimation accuracy of a given model over virtually 90 percent of its use is unknown. While the relative gain in accuracy achieved using the modified version may seem modest, it is nevertheless an observable gain.

If a procedure consistently produces more accurate estimates over the entire inter-censal period, relatively slight gains in accuracy tend to accumulate if for no other reason than that later estimates tend

to be smoothed or adjusted to earlier estimates. Furthermore, even slight gains in accuracy are worth pursuing because population estimates produced by many state demographic centers and the U.S. Bureau of the Census are used as a basis for allocating funds (Engels, 1978; Rosenberg and Myers, 1977; and U.S. Bureau of the Census, 1973).

Recall that a number of studies were cited above in which the temporal stability of model coefficients was found to be a major factor in the accuracy of post-censal estimates using the ratio-correlation method. Examination of the regression coefficients in Table 1.B and the corresponding ones in Table 2.B provides an example of change in the structure of relationships for Washington state. The modified model provides a tractable means for attempting to cope with this type of instability. Further, recall also that it was earlier suggested that perhaps one reason why Ericksen's (1974) "regression sample method" has not gained general acceptance is because of the difficulties involving coordination—and collection—of the data sets it requires. Compared with Ericksen's procedure, one advantage of the one presented here is that it does not impose any additional data collection and data coordination burden on a user. The procedure relies only on information that is contained wholly within the data necessary for a ratio-correlation procedure.

An alternative method that could be used to deal with the instability problem is ridge regression (see, e.g., Hoerl and Kennard, 1970), although this procedure is generally thought of as a means to cope with the instability of coefficients due to the large mean square errors associated with multicollinearity. Nonetheless, ridge regression provides a means of coefficient modification and it deserves some attention. A ridge procedure was conducted using the same data underlying the model data set used earlier. The optimally accurate ridge model was found where the bias level was equal to $k = .10$ (using increments of .01 from 0.00 to .10 and increments of .10 from .10 to .90). The optimally accurate model produced estimates for 1970 with absolute percentage error that exceeded 10 percent seven times (out of thirty-nine) and had a mean and standard deviation of 5.001 and 3.754, respectively. The Index of Misallocation of this model was 1.519 percent. The model clearly produced less accurate results than the model using the rank-order procedure, although it did provide more accurate estimates than did the original. Addi-

Table 4.—Summary Indices of Estimation Accuracy

Index	Model	
	Unmodified	Modified
Misallocation (IM)	1.560	1.493
Absolute Percent Error		
Mean	5.068	4.886
s.d.	3.813	3.639
N ≥ 10.00	5	5
N ≤ 3.00	15	16

Table 3.—Estimation Accuracy of the Two Models' Civilian Population under Sixty-Five Years by County, State of Washington, 1970

County	Enumerated Population	Estimated Population		Percentage Difference	
		Unmodified	Modified	Unmodified	Modified
Adams	11,102	11,387	11,458	2.570	3.207
Asotin	11,862	11,819	11,814	-0.360	-0.408
Benton	63,144	67,823	67,511	7.411	6.916
Chelan	35,862	36,373	36,177	1.426	0.879
Clallam	30,023	31,371	31,294	4.489	4.232
Clark	116,663	111,312	111,437	-4.587	-4.480
Columbia	3,771	4,222	4,161	11.953	10.340
Cowlitz	62,586	61,636	61,581	-1.518	-1.606
Douglas	15,287	16,375	16,252	7.116	6.312
Ferry	3,336	3,408	3,397	2.152	1.835
Franklin	23,983	24,770	24,631	3.281	2.700
Garfield	2,546	2,770	2,761	8.814	8.435
Grant	38,921	42,750	42,606	9.839	9.469
Grays Harbor	52,583	52,173	52,114	-0.779	-0.891
Island	20,589	22,215	22,148	7.897	7.572
Jefferson	9,235	9,551	9,473	3.423	2.579
King	1,054,271	1,035,704	1,037,937	-1.761	-1.549
Kitsap	86,529	85,989	85,821	-0.625	-0.818
Kittitas	22,764	19,972	19,863	-12.266	-12.744
Klickitat	10,729	11,968	11,923	11.552	11.132
Lewis	39,265	40,124	40,122	2.187	2.183
Lincoln	8,168	9,185	9,107	12.452	11.494
Mason	18,411	17,867	17,827	-2.956	-3.172
Okanogan	22,952	23,656	23,591	3.068	2.786
Pacific	13,310	12,834	12,795	-3.580	-3.872
Pend Oreille	5,185	5,919	5,893	14.162	13.648
Pierce	339,048	346,430	346,728	2.177	2.265
San Juan	3,089	2,947	2,918	-4.603	-5.544
Skagit	45,703	48,868	48,758	6.924	6.683
Skamania	5,330	5,360	5,358	0.554	0.527
Snohomish	245,193	231,238	231,996	-5.691	-5.382
Spokane	251,057	256,882	256,723	2.320	2.257
Stevens	15,178	15,814	15,780	4.189	3.969
Thurston	68,719	69,613	69,540	1.301	1.194
Wahkiakum	3,137	3,409	3,397	8.677	8.293
Walla Walla	36,608	38,323	38,271	4.686	4.543
Whatcom	72,111	70,801	70,670	-1.817	-1.998
Whitman	34,843	32,510	32,409	-6.696	-6.984
Yakima	128,960	136,455	136,283	5.812	5.679

tional research comparing the rank-order procedure and ridge regression may be useful within the ratio-correlation context, especially where the effects of instability due to temporal change can be distinguished from those due to multicollinearity.

Even in a situation where the entire rank-order procedure is not used, it can still provide some valuable information. For example, it may show that there has been no change in the rank-ordering of a model's coefficients over time. This gives some indication that the temporal instability issue may not be a major source of estimation error and that a given regression model can be used with some degree of confidence. The rank-order procedure may be of more importance in an area that has experienced rapid population change and for which it is obvious that an original model can not be expected to produce the most accurate estimates possible. A trade-off that must be evaluated for each situation is the one mentioned in the first section: the cost of reducing the number of independent variables, in order to conform to the limitations described earlier, against utilizing information about temporal change. While this may not be a problem for many users it is a potential source of difficulty that must be mentioned.

Less conservative approaches than that used in the "minimum" increments rank-order procedure introduced here may be possible but, as discussed earlier, one major hurdle to be surmounted is controlling for the sensitivity of $\hat{B}_*$ to errors in $(X'Y)_*$. It may be of interest to explore this issue in relation to producing optimally accurate estimates within the confines of the approach to coefficient modification described here. The rank-order procedure described in this paper, remember, is only intended to provide estimates that are more accurate than those available from an original model for which it is likely that structural changes have taken place over time. It does not necessarily provide an optimally accurate set of estimates available within the context of the information that can be gained from an estimation data set using the theoretical causal specification and path-analysis algebra exploited here.

NOTES

[1] Throughout the paper it is important to realize that while the proposed procedure relies upon the *conception* that a population must be causally prior to its symptomatic indicators, this is a theoretical construct that is used to exploit algebraic relationships in order to modify model coefficients. That is, this conception is a theoretical reversal that relies upon being able to assume that the dependent variable in the regression model is causally prior to its symptomatic indicators in a theoretical causal structure. In the actual estimation, the intent is still to produce a population estimate using the symptomatic indicators as a set of predictor variables.

[2] This second restriction is like the first in that it is necessary in order to exploit algebraic relationships, in this case, logarithms. If values are negative, then the logarithms required cannot be calculated.

[3] These data are in the official Washington State Population Data Base (File Base 526), available on request.

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